Series 1953, No. 6

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SOIL SURVEY

De Soto County Mississippi

OUR SOIL ★ OUR STRENGTH

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

THIS SURVEY of De Soto County will help you plan the kind of farming that will protect your soils and provide good yields. It describes the soils; shows their location on a map; and tells what they will do under different kinds of management.

Find Your Farm on the Map

In using this survey, start with the soil map, which consists of the map sheets bound in the back of this report. These sheets, if laid together, make a large photographic map of the county as it looks from an airplane. You can see woods, fields, roads, rivers, and many other landmarks on this map.

To find your farm on the large map, use the index to map sheets. This is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located.

When you have found the map sheet for your farm, you will notice that boundaries of the soils have been outlined in red, and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map.

Suppose you have found on your farm an area marked with the symbol Cg. You learn the name of the soil this symbol represents by looking at the map legend. The symbol Cg identifies Collins silt loam.

Learn About the Soils on Your Farm

Collins silt loam and all the other soils mapped are described in the section Description of the Soils. Soil scientists, as they walked over the fields and through the woodlands, described and mapped the soils, dug holes and examined surface soils and subsoils; measured slopes with a hand level; noted differences in growth of crops, weeds, brush, or trees; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming.

With help from farmers and many other people, the scientists placed each soil in a capability unit, which is a group of similar soils. Capability units can also be called management groups of soils. Capability units are grouped into capability classes and subclasses.

Collins silt loam is in soil capability unit 5. Turn to the section Use and Management of Soils and read what is said about soils in this capability unit. You will want to study the table which tells you how much you can expect to harvest from Collins silt loam under two levels of management. In columns A are yields to be expected under prevailing management, and in columns B are yields to be expected under improved management.

Make a Farm Plan

For the soils on your farm, compare your yields and farm practices with those given in this report. Look at your fields for signs of runoff and erosion. Then decide whether or not you need to change your methods. The choice, of course, must be yours. This survey will aid you in planning new methods, but it is not a plan of management for your farm or any other farm in the county.

If you find that you need help in farm planning, consult the local representative of the Soil Conservation Service or the county agricultural agent. Members of the staff of your State agricultural experiment station and others familiar with farming in your county will also be glad to help you.

The fieldwork for this survey was completed in 1953. Unless noted otherwise, all statements refer to conditions at the time of the survey.

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SOIL SURVEY OF DE SOTO COUNTY, MISSISSIPPI

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

Soil Survey Methods and Definitions

The scientist who makes a soil survey examines soils in the field, classifies the soils in accordance with facts that he observes, and maps their boundaries on an aerial photograph or other map.

FIELD STUDY.—The soil surveyor bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern, but are located according to the lay of the land. Usually they are not more than a quarter of a mile apart and sometimes they are much closer. In most soils such a boring or hole reveals several distinct layers, called horizons, which collectively are known as the soil profile. Each layer is studied to see how it differs from others in the profile and to learn the things about this soil that influence its capacity to support plant growth.

Color is usually related to the amount of organic matter. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture, or the content of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers, and is later checked by laboratory analysis. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer, and whether it is easy or difficult to cultivate.

Structure, which is the way the individual soil particles are arranged in larger grains and the amount of pore space between grains, gives us clues to the ease or difficulty with which the soil is penetrated by plant roots and by moisture.

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation.

Other characteristics observed in the course of the field study and considered in classifying the soil include the following: The depth of the soil over bedrock or compact layers; the presence of gravel or stones in amounts that will interfere with cultivation; the steepness and pattern of slopes; the degree of erosion; the nature of the underlying parent material from which the soil has developed; and acidity or alkalinity of the soil as measured by chemical tests. Many terms used in the report are defined in the glossary.

CLASSIFICATION.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified by series, types, and phases.

As an example of soil classification, consider the Commerce series. In De Soto County, this series is made up of three soil types, subdivided into phases, as follows.

Series	*Type*	*Phase*
Commerce	Very fine sandy loam	Nearly level phase.
	Silt loam	Very gently sloping phase.
	Silty clay loam	Nearly level phase.

Soil series.—Two or more soil types that differ in surface texture but that are otherwise similar in kind, thickness, and arrangement of soil layers are normally designated as a soil series. In a given area, however, it frequently happens that a soil series is represented by only one soil type. Each series is named for a place near which it was first mapped.

Soil type.—Soils having the same texture in the surface layers and similar in kind, thickness, and arrangement of soil layers are classified as one soil type. It is the basic classification unit.

Soil phase.—Because of differences other than those of kind, thickness, and arrangement of layers, some soil types are divided into two or more phases. Slope variations, frequency of rock outcrops, degree of erosion, depth of soil over the substratum, or natural drainage, are examples of characteristics that suggest dividing a soil type into phases.

The soil phase (or the soil type if it has not been subdivided) is the unit shown on the soil map. It is the unit that has the narrowest range of characteristics. Use and management practices therefore can be specified more easily than for soil series or yet broader groups that contain more variation.

Miscellaneous land types.—Fresh stream deposits and rough, stony, and severely gullied land that have little true soil are not classified into types and series, but are identified by descriptive names, such as Gullied land, Grenada soil material.

Soil complex.—When two or more soils are so intricately associated in small areas that it is not feasible to show them separately on the soil map, they are mapped together and called a soil complex. An example of this is Lexington-Loring-Providence silt loams.

Undifferentiated soils.—Two or more soils that are not regularly associated geographically may be mapped as an undifferentiated group—a single unit—if the differences between them are too slight to justify a separation. Examples are Falaya and Waverly silt loams, local alluvium phases.

General Description of the County

De Soto County is in two physiographic regions. The western edge, or 15 percent of the total county area, is in the Mississippi River Alluvial Plain; the rest of the county is in the Loess Hills. From the beginning, De Soto County has been a productive agricultural area, and cotton has always been the most important cash crop. The dependence on cotton as the main crop has caused serious erosion of the soil.

New farming practices have been developed by the State Agricultural Experiment Station and the United States Department of Agriculture to help farmers control soil erosion on the more rolling and steep lands. Agriculture in De Soto County is changing because of increased interest in pastures, cattle raising, dairying, and soil and water conservation.

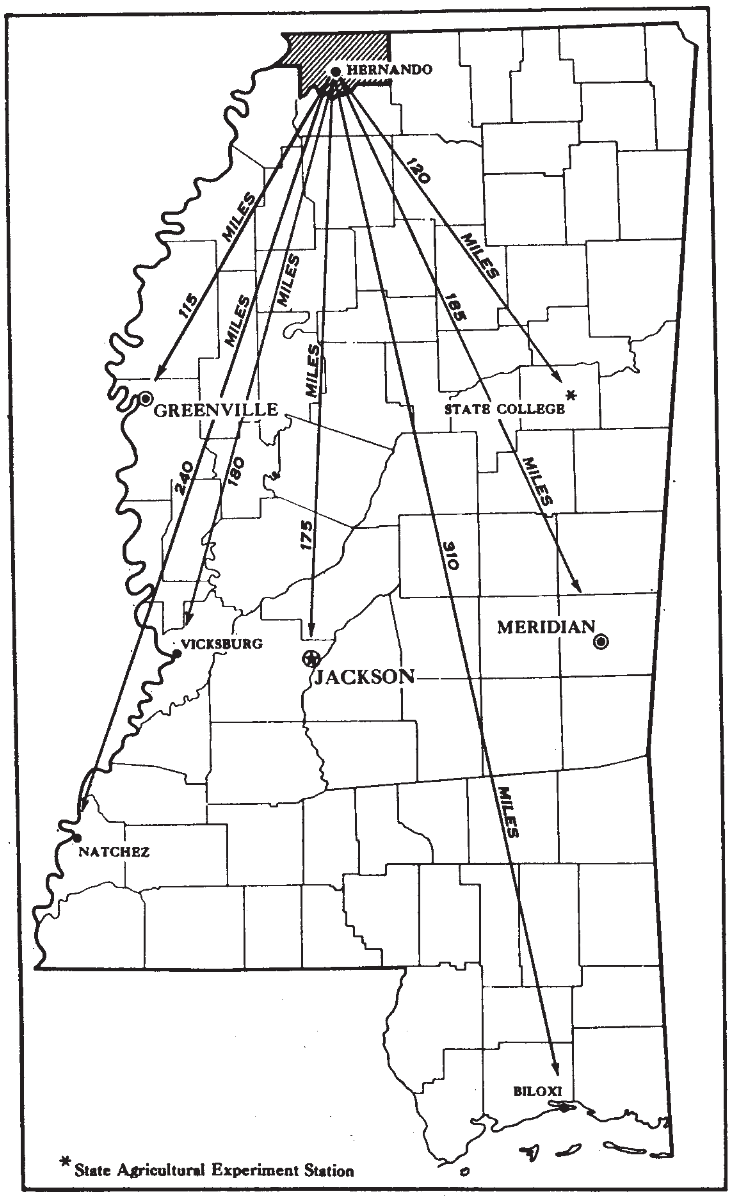

Figure 1.—Location of De Soto County in Mississippi.

This soil survey will help farmers and other users of the land adjust their management to the capabilities of the soil. The people of De Soto County recognized the need for a soil survey and voted a special tax appropriation to help pay for it.

Farmers have organized the De Soto County Soil Conservation District. The district, through its board of supervisors, arranges for farmers to receive technical help from the Soil Conservation Service in planning good use and conservation of the soils on their farms. The survey furnishes some of the facts needed for this technical help. The soil survey map and report are also useful to land appraisers, credit agencies, road engineers, and others who are concerned with the use and management of land.

Location and Extent

De Soto County is in the northwestern part of Mississippi. Hernando, the county seat, is north of Jackson and northwest of Tupelo. Distances by air from Hernando to principal cities in the State are shown in figure 1. The area of the county is 283,520 acres or approximately 443 square miles.

Climate

The climate of De Soto County is of the humid continental type. Summers are rather hot and winters are mild. Temperature and precipitation data compiled from United States Weather Bureau records are given in table 1.

The average frost-free period of 222 days extends from March 26 to November 4. The long growing season allows ample time for the maturing of most crops. An occasional frost late in spring sometimes damages young crops.

Rainfall is plentiful and fairly well distributed throughout the year. There are a few prolonged dry or wet periods nearly every year. Occasional dry periods in summer and fall damage crops and pastures. Infrequent wet periods in spring delay the preparation of seedbeds and the planting of crops. The time of relatively light precipitation coincides with the harvest season in fall.

Strong winds are uncommon except for a few days in the spring. Damaging tornadoes and hailstorms occur occasionally.

Soils of De Soto County

The relations, associations, and descriptions of soils are given in this section of the report.

General relations and associations of soils

A soil association is a pattern of soils that has a recognizable degree of uniformity or repetition of pattern. It consists of a few or of many soils, and they may be similar or contrasting. Soil associations afford a means of generalizing soil patterns on a small-scale map. They are useful in dealing with soils in a general way where soil information is needed for broad areas such as a group of farms or a section of a county. They are also useful for regional studies in which the nature and distribution of the separate soils are required.

Seven soil associations are shown on the soil association map of De Soto County (fig. 2). They are named accord-

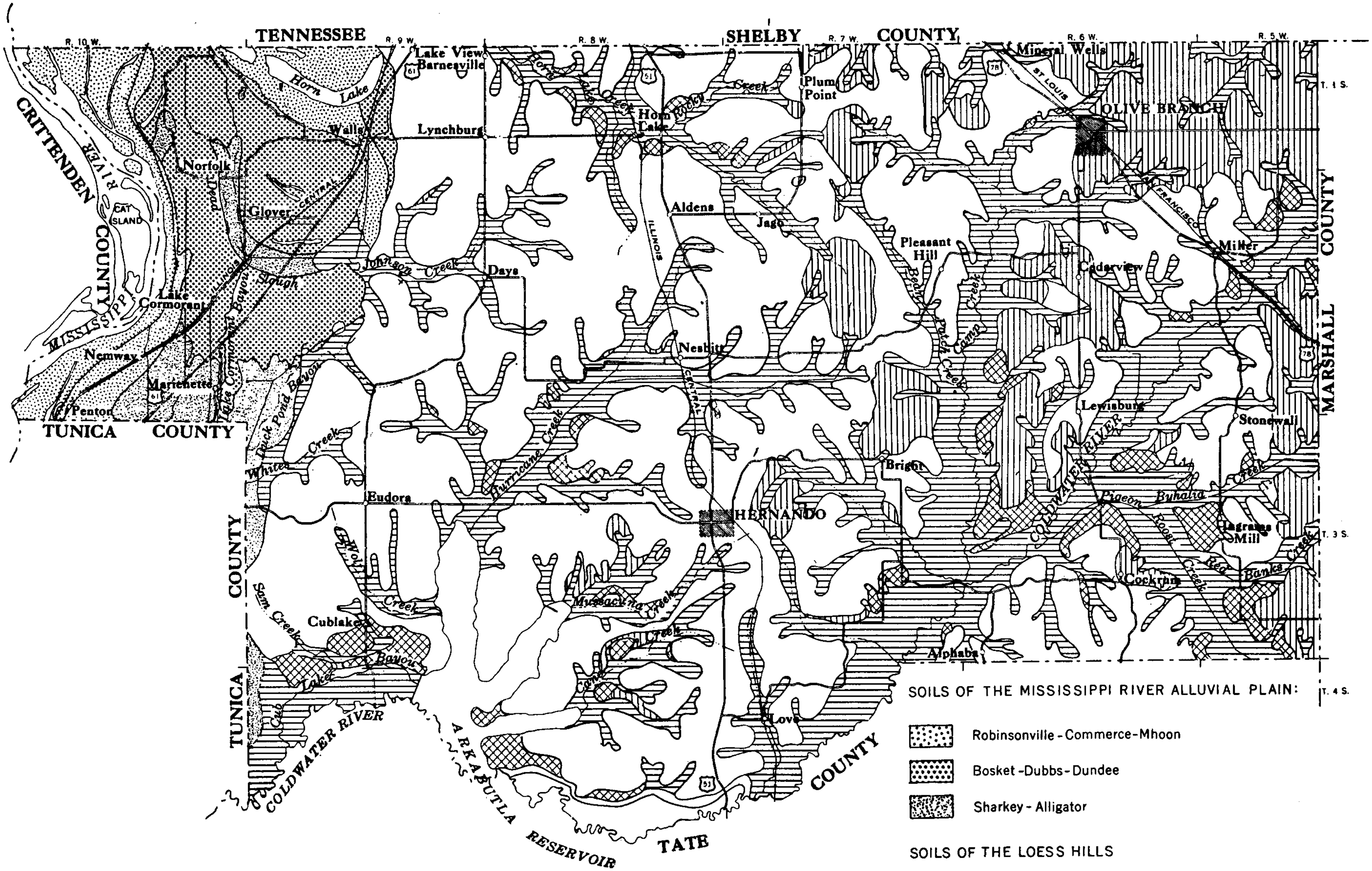

Figure 2.—**Soil associations in De Soto County.**

TABLE 1.—*Temperature and precipitation at Hernando Station, De Soto County, Miss.*

[Elevation 391 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1924)	Wettest year (1946)	Average snowfall
	° F.	° F.	° F.	Inches	Inches	Inches	Inches
December	43.6	79	−3	4.96	2.71	2.80	1.5
January	42.0	77	−12	3.90	3.84	12.15	1.6
February	44.6	83	0	3.57	1.53	7.57	1.1
Winter	43.4	83	−12	12.43	8.08	22.52	4.2
March	53.0	89	13	5.06	1.13	6.03	.2
April	61.7	90	23	4.96	5.67	2.47	(3)
May	69.8	98	37	4.36	5.01	10.40	0
Spring	61.5	98	13	14.38	11.81	18.90	.2
June	77.7	103	46	3.50	4.68	2.96	0
July	80.7	107	55	3.62	2.48	6.33	0
August	79.8	105	54	3.54	1.26	2.47	0
Summer	79.4	107	46	10.66	8.42	11.76	0
September	75.0	106	38	2.94	1.03	1.58	0
October	63.7	96	26	2.98	(3)	3.28	0
November	52.1	88	12	4.30	2.44	7.19	.1
Fall	63.6	106	12	10.22	3.47	12.05	.1
Year	62.0	107	−12	47.69	31.78	65.23	4.5

[1] Average temperature based on a 62-year record, through 1950; highest and lowest temperatures on a 38-year record, through 1930.
[2] Average precipitation based on a 71-year record, through 1955; wettest and driest years based on a 47-year record, in the period 1904–1955; snowfall based on a 29-year record, through 1930.
[3] Trace.

ing to the predominant soil series occurring in each. Three lie in Mississippi River Alluvial Plain and four in the Loess Hills.

Mississippi River Alluvial Plain

The Mississippi River Alluvial Plain is a nearly level area of alluvium that is from 5 to 9 miles wide in De Soto County. It consists of recent natural levees, older natural levees, depressions of former stream channels, and slack-water areas. It has formed mainly from Mississippi River alluvium. Sediments may have a maximum thickness of 200 feet. They contain a wide variety of minerals, as the drainage area includes parts of many States. These minerals are from unweathered and highly weathered materials.

The highest points on the Alluvial Plain are old natural levees that are 20 to 35 feet above the normal stage of the river. The lowest points are the depressions of former stream channels and slack-water areas; they are only a few feet higher than the normal stage of the river. Variations in relief are slight except on escarpments of old natural levees, where a difference in elevation of 20 feet is possible in a distance of 150 feet. The village of Walls is 210 feet above sea level, and Lake Cormorant is 205 feet. The gradient of the Mississippi River is low. At the northern boundary of the county, the river is about 170 feet above sea level; 11 miles downstream at the southern boundary, it is 165 feet above sea level.

About 80 percent of the Alluvial Plain is protected from floodwaters by a man-made levee. Drainage from this area flows into Lake Cormorant Bayou, near the southern boundary of the county. Drainage from the unprotected part of the Alluvial Plain flows directly into the Mississippi River.

Of the three soil associations that make up the Mississippi River Alluvial Plain, one occupies the recent natural levees, one is on the older natural levees, and one occupies slack-water areas and depressions.

ROBINSONVILLE-COMMERCE-MHOON ASSOCIATION

This soil association is on recent natural levees. Gradients are nearly level to very gently sloping. Soils are neutral to alkaline and light colored, and they have little or no profile development. Soil textures range from very fine sandy loam to silty clay. Drainage varies from good to poor.

Robinsonville soils are well drained and are on recent natural levees near the present channel or recent channels of the Mississippi River. Commerce soils are moderately well drained. Most of them are finer in texture, that is, they contain more clay; and they lie a little farther away from the stream channels than the Robinsonville soils. Mhoon soils contain still more clay. They lie farther away from the channels, where recent natural levees grade into the slack-water areas, and are somewhat poorly drained.

Included in this association are a few small, narrow areas of Dowling soils in depressions and a large wooded area of alluvial soils, located between the artificial levee and the river.

The soils of this association are among the most desirable in the county. They are relatively smooth, highly productive, and easily tilled and conserved. They are well suited to crops commonly grown in the area. Yields are uncertain from soils that are cultivated on the unprotected side of the levee. There is danger from overflow, but floods seldom occur during the growing season.

BOSKET-DUBBS-DUNDEE ASSOCIATION

This soil association is on the older natural levees. Gradients are nearly level to very gently sloping. The soils are not subject to ordinary flooding, and they are similar in many respects to the soils on recent natural levees. They have practically the same textural and drainage sequence. The first stages of their formation were the same. Soils on the older natural levees, however, have been under the influence of soil-forming processes a longer time and, consequently, are the best developed soils on the Mississippi River Alluvial Plain. Lime has been leached from the profiles, and most soils in this association are slightly to strongly acid. Very fine sandy loam surface soils predominate, but some areas have silt loam or silty clay loam surface soils.

The Bosket soils are well drained. They are mostly in long, rather narrow, nearly level to very gently sloping ridges. The Dubbs soils are also well drained. They were developed from slightly finer textured sediments than Bosket soils. They occur in very gently sloping to gently sloping, long, narrow ridges. The Dundee soils are not as well drained as the Dubbs soils. Some types have developed from materials of heavier texture. Dundee soils are on moderately broad ridges and narrow slopes that range from nearly level to gently sloping. The Forestdale soils are more poorly drained than the Bosket, Dubbs, and Dundee soils. They usually occur between other soils of the old natural levees and the slack-water soils on broad, nearly level areas.

An undifferentiated unit of Beulah and Dundee soils, consisting of coarse and fine textured materials, is also in this soil association. These soils usually occur on the steeper slopes and escarpments of bayous and former stream channels. Some long, narrow areas of Dowling soils in depressions are also included.

Soils of this association are easily tilled and very productive and respond to good management. They are especially well suited to cotton, corn, winter cover crops, and winter forage for grazing. They are not well suited to rice.

SHARKEY-ALLIGATOR ASSOCIATION

This soil association is on broad slack-water areas. The soils are level to nearly level. A few areas are gently sloping. The soils are characteristically high in content of clay and are poorly drained. In prolonged wet weather, some areas of this association are subject to local overflow, but this seldom occurs during the season in which crops are grown. The great amount of water and the difficulty of locating suitable outlets make it hard to drain excessive surface water from these soils. Large cracks form in the soil during long dry spells.

Sharkey soils are dominant in this association. They occur in deep beds of fine-textured material. They are slightly acid to alkaline. Alligator soils are very similar to Sharkey soils. They differ primarily in being more acid throughout the profile and lighter colored and in having more prominent and numerous mottles.

Included in this association are a few very small areas of moderately well drained soils. Dowling clay, a poorly drained soil of the depressions, is in this association.

Because of the high clay content, the soils of this association can be tilled over only a narrow range of moisture content. The soils are usually worked in fall when the content of moisture is optimum for plowing. They are disturbed as little as possible when crops are planted in spring.

The soils are excellent for rice, good for soybeans and small grains, and fair to poor for cotton and corn.

Loess Hills

The Loess Hills were formed primarily from accumulations of loess that ranged from 4 to 30 feet in thickness. Some areas within the Loess Hills were formed from layers of loess less than 4 feet thick, underlain by sandy and gravelly Coastal Plain materials. A few small outcrops of Coastal Plain materials are also in the Loess Hills. The areas included in the Loess Hills consist of uplands, stream terraces, and the bottoms or flood plains.

According to the generally accepted theory, the loess was deposited during the ice age. Melting glaciers created a river much larger than the present Mississippi River that carried rock flour and finely ground rock toward the Gulf. Much of this material was deposited as river sediment along the drainageway and exposed to winds in winter when the flow of water was reduced. The prevailing southwesterly winds blew this sediment into the air and deposited it on the hills and valleys along the eastern rim of the river valley. The layer of loess is thickest near the Mississippi River Alluvial Plain and thins out toward the east.

A large part of the Loess Hills has been eroded. The damage is most severe where cotton has been grown on slopes that are too steep for row crops. The strongest slopes are on the loess bluffs bordering the eastern side of the Mississippi River Alluvial Plain. The more nearly level upland is in the northwestern part of the county near the Tennessee State line. Gullied land occurs throughout the county.

Olive Branch in the northeast corner of the county is 400 feet above sea level. Other altitudes are Pleasant Hill, 380 feet and Eudora, 300 feet.

Of the 4 associations that make up the Loess Hills, 2 occupy upland positions, 1 consists mainly of stream terraces, and 1 consists mainly of bottoms or flood plains of streams in the Loess Hills.

MEMPHIS-LORING ASSOCIATION

This soil association extends over a large part of the Loess Hills and consists of the better drained soils of uplands. They have developed from deep loess, and they occupy very gently sloping to moderately steep ridges and slopes. Surface soil textures generally range from silt loam to silty clay loam, depending on the severity of erosion. Where the original silt loam surface soil is gone, the silty clay loam subsoil is exposed.

The Memphis soils are well drained and are on very gently sloping to gently sloping rather narrow ridges and on gently sloping to moderately steep slopes. The Loring

soils are moderately well drained to well drained and occur on very gently sloping to moderately steep ridges and slopes. The weakly developed Natchez soils are somewhat excessively drained. They occur in the western part of the association. They occupy the steeper slopes of the loess bluffs.

Included with this association are the Lexington-Loring-Providence and the Brandon-Loring complexes. They occur in the southeastern part of the county bordering some of the larger stream flood plains. Guin and Kershaw soils, developed from Coastal Plain material, occur in a few small areas in this association. Areas of local alluvium phases of soils of the bottom lands too small to show on the soil association map are also included.

Soils in this association are productive, but slopes over 5 percent are subject to severe erosion. The ridgetops and milder slopes are suited to intensive cultivation if soil and moisture conservation is practiced. The moderate slopes are suitable for pasture and perennial crops; steeper slopes are best for forestry.

GRENADA-CALLOWAY ASSOCIATION

This soil association is mainly in the northeastern part of the county, and it consists of the less well-drained soils of uplands. They have formed from deep loess and occupy mainly the very gently sloping to gently sloping low broad tops of ridges. A small part of the association consists of long narrow slopes that range from 5 to 12 percent.

The Grenada soils are moderately well drained. They are limited chiefly to the broader, more level areas in the northeastern part of the county. Some small scattered areas are in other parts of the Loess Hills. Calloway soils are somewhat poorly drained. They occur on very gently sloping to gently sloping relief in the northeastern part of the county. The Henry soils are poorly drained. They are not extensive and occur in flat or depressed positions. Henry soils and the predominant Grenada and Calloway soils have a fragipan at various depths that restricts the movement of water.

The local alluvium phases of Collins, Falaya, and Waverly soils occur in this association at the foot of slopes, in upland depressions, and along drainageways in areas that are too small to show on the soil association map.

Most of this association is subject to severe erosion, especially the soils on slopes stronger than 5 percent. A large part of the association is fairly well suited to cotton and corn. The stronger slopes are suitable for pasture or other perennial crops.

LINTONIA-RICHLAND-OLIVIER ASSOCIATION

This association is on the stream terraces that border the flood plains of larger streams in the Loess Hills. The soils have developed from silty stream alluvium when the streams flowed at a much higher level. They are known locally as bench land or second bottoms. Surface soil texture is mainly silt loam, but where most or all of the original surface soil has been removed by erosion, the surface texture is now a heavy silt loam. The relief ranges from broad nearly level and very gentle slopes to stronger slopes on escarpments that border streams or the channels of former streams.

Lintonia soils are well drained; the profile is nearly free from mottling. Richland soils are moderately well drained; the lower subsoil is mottled and there is a moderately compact fragipan at depths of 24 to 36 inches. Olivier soils are somewhat poorly drained; the subsoil is highly mottled and a compact fragipan begins at depths of 18 to 24 inches beneath the surface. Calhoun soils are poorly drained and have a fragipan at depths of 8 to 15 inches.

The local alluvium phases of the Collins, Falaya, and Waverly series occur in this association but are of minor extent.

Soils of the association are subject to severe erosion, especially if slopes exceed 5 percent. The better drained soils on nearly level or gentle slopes are suitable for intensive cultivation if soil and water conservation is practiced. The steeper slopes are suitable for pasture and forest.

VICKSBURG-COLLINS-FALAYA ASSOCIATION

This association is mainly on the bottoms or flood plains of streams in the Loess Hills. However, small areas are on the eastern edge of the Mississippi River Alluvial Plain where the smaller streams have deposited silty alluvium that washed from soils of the Loess Hills.

The surface-soil textures in this association are predominantly silt loam. In some areas the surface soil is a silty clay loam; in a few very small areas it is fine sandy loam. The better drained, coarser textured soils are usually near the channels of streams; the finer textured soils are farther from the channels in slack-water areas.

The Vicksburg soils are well drained and are nearly free from mottles. Collins soils are somewhat poorly to moderately well drained. Mottles begin at depths of 14 to 32 inches. Falaya soils are somewhat poorly drained and are mottled at depths beginning at 6 to 14 inches. The Waverly soils are characterized primarily by their gray color and poor drainage.

Much of the area of this soil association is subject to periodic flooding, but crops are seldom damaged unless they are growing on the more poorly drained soils. Floods or excessive water may prevent the timely planting of crops in spring. The soils of this association are among the most productive in the county for cultivated crops. The better drained ones are well suited to intensive cultivation of the crops commonly grown in the area. The more poorly drained soils are best suited to corn, pasture, or forests.

Description of the Soils

In this section the soils, identified by the symbols that are on the soil map, are described in detail, and their land-capability unit is given. The important characteristics of the soil series of the Mississippi River Alluvial Plain are shown in table 2, and those of the soil series in the Loess Hills are given in table 3. The approximate acreage and the proportionate extent of the soils mapped in De Soto County are shown in table 4.

Alligator clay, nearly level phase (½ to 2 percent slopes) (Aa).—This poorly drained soil developed from fine-textured Mississippi River alluvium. It occupies the slack-water areas and occurs in the southeastern part of the Mississippi Alluvial Plain in close association with the soils of the Sharkey and Forestdale series. Alligator clay differs from Sharkey clay, mainly in being lighter colored and more mottled throughout the profile, and it is usually more acid. It differs from Forestdale soils in having fine-textured material throughout the profile. Runoff is slow, and internal drainage is slow to very slow. When plowed

and allowed to weather, the clods tend to fall apart into small aggregates. Large cracks develop in the soil when the subsurface becomes dry. The soil is commonly called gumbo or buckshot land.

Natural forest cover includes red, black, and tupelo-gums, yellow-poplar, hickory, willow, cypress, pecan, and several kinds of water-loving oaks. There is an undergrowth of brush and vines.

Profile description:

- 0 to 4 inches, dark grayish-brown clay; very firm when moist, very plastic when wet; medium to fine granular; medium acid.
- 4 to 24 inches, grayish-brown clay, mottled prominently with medium brown and yellow; very firm when moist, very plastic when wet, and very hard when dry; massive but weak medium to coarse blocky peds form when dry; medium acid.
- 24 to 40 inches +, light brownish-gray clay, mottled prominently with brown and yellow; very firm when moist, very hard when dry; massive structure; medium acid.

When first cleared, this soil has a fairly high organic-matter content that tends to disappear under most types of cultivation.

Alligator clay, nearly level phase, includes a few small level areas that are mainly along the southern boundary of the county. It also includes a few small scattered areas that are very gently sloping and a few scattered areas that have silty clay surface soils.

Use and management.—Nearly all of this soil is cleared and used for crops; a small part is idle. Cotton and soybeans are the chief crops, although some rice and oats are grown. Yields of rice are good, but those of cotton and soybeans are fairly good if seasons are favorable and dry. Yields of oats are usually poor. The growing of winter cover crops is difficult because of the dangers of flooding and winterkilling.

The content of available plant nutrients is high in this soil, but poor drainage and high content of clay limit the yields of most crops. The high clay content narrows the range of moisture at which the soil can be easily tilled. For most crops the usual practice is to bed the land in the fall or winter and disturb it as little as possible during spring planting operations. Adequate surface drainage is a problem because outlets low enough to remove the excess water are difficult to find. Open ditches are usually dug to remove excess water as rapidly as conditions allow. This soil is in capability unit 20.

Alluvial soils (0 to 20 percent slopes) (Ab).—These soils occur in the large wooded areas between the levee and the Mississippi River. Most areas are on the recent natural levees, but some are in depressions and slack-water positions. Alluvial soils are subject to frequent overflow during the spring and early summer. The drainage ranges from excessive to poor, but much of the area is well drained. Alluvial soils are neutral to alkaline.

Most slopes are less than 5 percent. The stronger slopes are along present or former stream channels.

This mapping unit includes a wide variety of soils and soil materials, and the texture varies from sand to clay. Cleared areas are mapped as soils of the Robinsonville, Commerce, and Mhoon series. Many borrow pits where soil was obtained for building the artificial levee are included in this unit.

Use and management.—Many of these alluvial soils would be very desirable for agriculture if they were protected from flooding. The clearing and cultivation of these soils is usually not practical. Some areas, however, have been cleared and produce good crops except when flooded during cropping seasons. Good forest management—protection from fire, removal of undesirable species, and selective cutting—pays well on this land. These soils have not been classified as to capability.

Beulah and Dundee soils, gently sloping phases (5 to 8 percent slopes) (Ba).—This undifferentiated mapping unit occurs on the slopes bordering former channels of the Mississippi River. Some areas consist mainly of soil of the Beulah series; others consist only of Dundee soils, and others are a mixture of both soils.

Beulah soils are sandy, somewhat excessively drained, and medium to strongly acid. They tend to be droughty, especially during long dry periods.

Profile description of Beulah very fine sandy loam, very gently sloping phase:

- 0 to 6 inches, brown very friable very fine sandy loam; medium acid.
- 6 to 28 inches, light yellowish-brown very friable very fine sandy loam, slightly finer textured in the upper part; medium acid.
- 28 to 42 inches, yellowish-brown very friable to loose fine sandy loam to loamy fine sand; essentially structureless; strongly acid.

The surface soil texture ranges from very fine sandy loam to fine sandy loam, but the predominating texture is very fine sandy loam.

The Dundee soils included in this mapping unit are described under Dundee very fine sandy loam and Dundee silty clay loam.

Within the area mapped as Beulah and Dundee soils, gently sloping phases, there are many variations. Surface soil textures range from sand to clay. Surface drainage may be good to excessive, depending on the slope, but internal drainage ranges from poor to somewhat excessive. Slopes range from 2 to 20 percent; the stronger slopes are on abrupt escarpments along former stream channels. Included with this unit is a nearly level area located 1 mile east of the village of Lake Cormorant.

Use and management.—Practically all areas of Beulah and Dundee soils, gently sloping phases, are cleared and used for crops or pasture. Since most of the soil areas are small, they are usually managed like the adjacent soils. Land should be cultivated along the contour to help prevent erosion. Green-manure crops and fertilizers should be used to improve the soil. This soil is in capability unit 19.

Bosket very fine sandy loam, very gently sloping phase (2 to 5 percent slopes) (Bc).—This moderately extensive, well-drained soil has developed from moderately sandy alluvial sediments. It occupies long narrow ridges on the old natural levees in the central and northern part of the Mississippi River Alluvial Plain and is rarely subject to overflow. All the acreage is protected by levees. This soil is associated with the nearly level phase of Bosket very fine sandy loam and with soils of the Beulah, Dubbs, Dundee, and Dowling series. Bosket soils are less well drained than Beulah and better drained than the Dundee. Their subsoils are not as well developed as those in Dubbs soils. Bosket soils occupy ridges, whereas Dowling soils are in depressions.

This soil contains no layers in the profile that greatly impede root development or moisture movement. It is low in content of organic matter, but it has a moderate to high content of available plant nutrients, especially of phosphorus and potassium. It has good tilth and favor-

TABLE 2.—*Important characteristics of the soil*

Soil series	Topographic position	Permeability	Drainage class	Surface soil			
				Color	Texture	Consistence	Range in thickness
							Inches
Alligator	Slack-water area	Very slow	Poor	Dark grayish brown.	Clay	Very firm	3–5
Beulah	Old natural levees.	Rapid	Somewhat excessive.	Brown	Very fine sandy loam and fine sandy loam.	Very friable to loose.	6–8
Bosket	do	Moderately rapid.	Good	do	Very fine sandy loam.	Very friable	6–8
Commerce	Recent natural levees.	Moderately slow.	Moderately good.	Grayish brown	Very fine sandy loam, silt loam, and silty clay loam.	Very friable to friable.	6–8
Dowling	Depressions	Very slow	Poor	Dark gray	Clay and silty clay	Firm to very firm.	3–6
Dubbs	Old natural levees.	Moderate	Good	Grayish brown	Very fine sandy loam and silt loam.	Very friable	6–8
Dundee	do	Moderately slow.	Moderately good.	do	Very fine sandy loam, silt loam, and silty clay loam.	Very friable to friable.	6–8
Forestdale	do	Slow	Somewhat poor to poor.	Pale brown	Silt loam and silty clay.	Friable	4–6
Mhoon	Recent natural levees.	do	Somewhat poor	Dark grayish brown mottled with pale brown.	Silty clay loam and silty clay.	Friable to firm	4–6
Robinsonville.	do	Moderately rapid.	Good	Brown	Very fine sandy loam.	Very friable	6–8
Sharkey	Slackwater areas.	Very slow	Poor	Very dark gray	Clay	Very firm	3–4

able moisture-holding capacity for most crops that are commonly grown in the county.

The native vegetation consisted chiefly of oaks, hickory, pecan, ash, and gum and a heavy undergrowth of vines and canes.

Profile description:

0 to 6 inches, brown very friable very fine sandy loam; medium to fine weak crumb structure; slightly acid.
6 to 18 inches, dark-brown friable light sandy clay loam; weakly developed medium blocky structure; slightly acid.
18 to 42 inches, brown very fine sandy loam; essentially structureless; slightly acid.

The material below the 18- to 42-inch layer is usually yellowish brown and ranges in texture from a very fine sandy loam to loamy fine sand.

The 6- to 18-inch layer ranges from dark brown to yellowish brown, and from sandy clay loam to silty clay loam. The color of the 18- to 42-inch layer ranges from brown to yellowish brown, and the texture is sandier in places than in the profile described.

Included in this mapping unit are a few small gently sloping areas, most of which are near the town of Glover.

Use and management.—This is one of the most productive soils of the county. All of it is cleared, and practically all is used continuously for row crops. Cotton—the chief crop—is grown on 80 percent of the soil. Corn and some soybeans are also grown.

Contour cultivation is practiced by a majority of the farmers. Erosion is active during heavy rains, but it is not a serious hazard. This soil is usually given moderate to heavy applications of nitrogen for cotton and corn, as well as some lime. Winter cover crops, such as vetch, Austrian peas, and burclover, are commonly turned under. This soil is in capability unit 2.

Bosket very fine sandy loam, nearly level phase (½ to 2 percent slopes) (Bb).—This soil differs from the very gently sloping phase chiefly in slope. In addition, the surface layer tends to be slightly thicker and the surface drainage a little slower.

series of the Mississippi River Alluvial Plain

Surface soil—Continued	Subsoil				Acidity	Texture of underlying material
Reaction	Dominant color	Texture	Consistence	Structure		
Medium acid	Grayish brown mottled with brown and yellow.	Clay	Very firm	Massive or weak blocky.	Medium acid	Clay.
Medium acid to strongly acid.	Light yellowish brown.	Very fine sandy loam to fine sandy loam.	Very friable to loose.	Massive to single grain.	Strongly acid	Loamy fine sand.
Slighty acid	Dark brown	Sandy clay loam	Friable	Weak fine subangular blocky and single grain.	Slightly acid	Fine sandy loam.
Neutral to alkaline.	Dark grayish brown, dark brown, or brown mottled with yellow and brown.	Silt loam to silty clay loam.	do	Structureless	Neutral to alkaline.	Silty clay loam to silty clay.
Slightly acid	Dark gray mottled with gray, yellow, and brown.	Clay	Very firm	Massive	Slightly acid to neutral.	Clay.
Medium acid to slightly acid.	Dark grayish brown or yellowish brown.	Silty clay to silty clay loam.	Firm to friable.	Strong medium subangular blocky.	Medium acid to slightly acid.	Fine sandy loam and very fine sandy loam.
Strongly acid to slightly acid.	Brown to pale brown mottled with gray and yellow.	Silty clay to silty clay loam.	do	Weak medium subangular blocky.	Medium acid to strongly acid.	Very fine sandy loam to silt loam.
Strongly acid	Light gray mottled with strong brown.	Silty clay to silty clay loam.	do	do	Strongly acid	Silt loam to sandy clay loam.
Neutral to alkaline.	Dark grayish brown and dark gray mottled with dark yellowish brown and dark brown.	Silty clay to silty clay loam.	do	Massive	Neutral to alkaline.	Silty clay loam to silt loam.
Neutral to alkaline.	Yellowish brown	Silt loam to very fine sandy loam.	Very friable	Structureless	do	Very fine sandy loam to loamy sand.
Slightly acid to alkaline.	Dark gray mottled with dark brown and dark yellowish brown.	Clay	Very firm	Massive or weak blocky.	Slightly acid to alkaline.	Clay.

This soil is in the central and northern parts of the Mississippi River Alluvial Plain, but it is not as extensive as the very gently sloping phase. Most of the acreage lies in rather broad areas in association with the soils of the Beulah, Dubbs, and Dundee series.

Use and management.—All the acreage is cleared, and practically all is used continuously for row crops. Most of it is managed like the very gently sloping phase, except that contour cultivation is seldom needed. An occasional shallow ditch may be needed to help remove excessive surface water. This soil is in capability unit 1.

Brandon-Loring silt loams, strongly sloping phases (12 to 17 percent slopes) (Bd).—This complex of soils is composed of Brandon and Loring soils that occur in such an intricate pattern that they cannot feasibly be mapped separately. This complex is on the steeper slopes that border the bottom lands of the larger streams in the Loess Hills, primarily in the eastern half of the county. Brandon soils make up 70 percent of the complex, and they occupy the lower part of slopes; Loring soils occupy the upper part of slopes.

Brandon soils are well drained and are composed of a relatively thin mantle of loess over gravelly coastal plain material. Loring soils are moderately well drained to well drained and were derived from deep loess. This complex occurs in association with the Lexington-Loring-Providence complex of soils that have developed from a thin mantle of loess underlain by gravelly Coastal Plain material. The Brandon-Loring complex is also associated with the Guin soils that have formed entirely from gravelly Coastal Plain material.

Profile description of Brandon silt loam, strongly sloping phase:

0 to 8 inches, dark yellowish-brown to light yellowish-brown friable silt loam; moderate fine and medium granular structure; strongly acid.

8 to 25 inches, brown to yellowish-brown friable silty clay loam; structure faces show gray color that tends to disappear

TABLE 3.—*Important characteristics*

Soil series	Topographic position	Parent material	Dominant relief	Drainage class	Surface soil	
					Color	Texture
Brandon	Upland	Shallow loess over coastal plain gravelly material.	Strongly sloping	Good	Dark yellowish brown to light yellowish brown.	Silt loam
Calhoun	Stream terraces.	Old alluvium from soils developed in loess.	Nearly level to very gently sloping.	Poor	Dark grayish brown to light yellowish brown.	do
Calloway	Upland	Deep loess	Very gently sloping to gently sloping.	Somewhat poor	Dark yellowish brown to yellowish brown.	do
Collins	Bottom land	Recent alluvium from soils developed in loess.	Nearly level	Somewhat poor to moderately good.	Pale brown and brown	Silt loam and silty clay loam.
Falaya	do	do	do	Somewhat poor	Light grayish brown to light brown.	do
Grenada	Upland	Deep loess	Very gently sloping to sloping.	Moderately good.	Grayish brown	Silt loam
Guin	do	Coastal plain gravel, sand, and clay.	Moderately steep	Excessive	Dark grayish brown and brown.	Gravelly sandy loam.
Henry	do	Deep loess	Nearly level	Poor	Grayish brown to pale brown.	Silt loam
Kershaw	do	Coastal plain sand	Moderately steep	Excessive	Dark reddish brown	Loamy sand to sand.
Lexington	do	Shallow loess over sandy coastal plain material.	do	Good	Dark yellowish brown to light yellowish brown.	Silt loam
Lintonia	Stream terraces.	Old alluvium from soils developed in loess.	Very gently sloping.	do	Dark yellowish brown to brown.	do
Loring	Upland	Deep loess	Very gently sloping to moderately steep.	Moderately good to good.	do	do
Memphis	do	do	do	Good	do	do
Natchez	do	do	Steep	Somewhat excessive.	Dark grayish brown to brown.	do
Olivier	Stream terraces.	Old alluvium from soils developed in loess.	Nearly level to gently sloping.	Somewhat poor	Dark yellowish brown to yellowish brown.	do
Providence	Upland	Shallow loess over sandy coastal plain material.	Moderately steep	Moderately good.	Grayish brown to yellowish brown.	do
Richland	Stream terraces.	Old alluvium washed from soils developed from loess.	Very gently sloping to sloping.	do	Very dark grayish brown to grayish brown.	do
Vicksburg	Bottom land	Recent alluvium from soils developed in loess.	Nearly level	Good	Brown	do
Waverly	do	do	do	Poor	Dark grayish brown mottled with yellowish brown and gray.	Silty clay loam.

of the soil series of the Loess Hills

Surface soil		Subsoil				Additional features of the profile
Consistence	Range in thickness	Dominant color	Texture	Consistence	Structure	
	Inches					
Very friable	3–8	Brown to yellowish brown.	Light silty clay loam.	Friable	Moderate fine and medium granular.	The subsoil rests upon gravelly Coastal Plain material at depths of 12 to 40 inches.
Friable	3–8	Pale brown to gray mottled with strong brown and yellowish brown.	Silty clay loam	Firm to friable.	Weak to fine moderate medium blocky.	Strong fragipan layer at depths of 8 to 15 inches.
do	5–12	Yellowish brown to light yellowish brown mottoed with dark brown and gray.	Heavy silt loam	Friable	Massive	Strong fragipan at depths of 12 to 20 inches.
do	6–12	Brown or grayish brown mottled with dark brown and gray.	Silt loam	do	Weak fine granular to massive.	Mottled at depths of 14 to 32 inches.
do	4–10	Pale brown mottled with light gray.	Silt loam and silty clay loam.	do	Massive	Mottled at depths of 6 to 14 inches.
do	3–6	Yellowish brown with strong brown or gray in lower part.	Heavy silt loam	do	Moderate to weak, medium to fine subangular blocky.	Strong fragipan layer at depths of 20 to 30 inches.
Very friable	6–12	Red	Gravelly sandy clay.	Firm	Massive	
Friable	4–8	Light brownish gray to white mottled with yellowish brown.	Silt loam to silty clay loam.	Friable	Fine granular to massive.	Fragipan at depths of 10 to 16 inches.
Loose	6–12	Yellowish red	Sand	Loose	Single grain	Dark-colored surface phase.
Very friable	3–8	Brown to light brown	Light silty clay loam.	Friable	Strong medium and coarse subangular blocky.	The subsoil rests upon sandy Coastal Plain material at depths of 12 to 40 inches.
Friable to very friable.	3–6	Yellowish brown to strong brown.	Silty clay loam	do	Weak medium blocky.	May be mottled at depths of 30 to 40 inches.
Friable	3–6	do	do	do	Moderate medium subangular blocky.	Moderate fragipan at depths of 30 to 36 inches.
do	3–8	Dark brown to strong brown.	do	do	do	
Very friable	3–8	Yellowish brown to dark yellowish brown.	Silt loam	Very friable.	Massive to fine granular.	Alkaline or calcareous at depths of 36 to 48 inches.
Friable	4–10	Yellowish brown to light yellowish brown mottled with dark brown and gray.	Heavy silt loam	Friable	Moderate medium subangular blocky.	Strong fragipan at depths of 15 to 24 inches.
do	3–8	Yellowish brown mottled with strong brown or gray in lower part.	Silty clay loam	do	do	The subsoil rests upon sandy Coastal Plain material at depths of 12 to 40 inches, and a rather compact fragipan layer is at the point of contact.
do	3–8	Yellowish brown mottled with yellow, gray, and dark brown in lower part.	Heavy silt loam	Friable to firm.	Weak medium blocky.	Strong fragipan layer is at depths of 24 to 36 inches.
do	8–10	Yellowish brown to light yellowish brown.	Silt loam	Very friable.	Essentially structureless.	May be faintly mottled at depths of 32 to 40 inches.
Friable to firm.	4–8	Gray mottled with dark yellowish brown and yellowish red.	Silty clay loam and silty clay.	Firm	Massive	

on moistening; moderate fine and medium granular; strongly acid.

25 inches +, strong-brown to yellowish-red gravelly light sandy clay loam; dry structure faces show much gray color that tends to disappear on moistening; indefinite structure; strongly acid.

There is considerable variation in the depth to the gravelly material. In places near the foot of slopes, some gravel is on the surface; in other places, the gravel occurs at depths of about 40 inches.

Loring silt loam, strongly sloping phase, is described elsewhere in this report.

There are a few areas included with this complex that have slopes up to 22 percent.

Use and management.—Nearly all of these soils are in a hardwood forest from which most of the marketable timber has been cut. A few areas have been cleared and are used for pasture. Since the hazard of erosion is great, these soils should be permanently in protective vegetation. Some of the less sloping areas can be cleared and used for permanent pasture if soil erosion is prevented. Fertilizers and lime are required for pastures. This soil is in capability unit 27.

TABLE 4.—*Approximate acreage and proportionate extent of soils*

Soil	Area	Extent
	Acres	*Percent*
Alligator clay, nearly level phase	466	0. 2
Alluvial soils	4, 565	1. 6
Beulah and Dundee soils, gently sloping phases	405	. 1
Bosket very fine sandy loam:		
Very gently sloping phase	1, 140	. 4
Nearly level phase	538	. 2
Brandon-Loring silt loams, strongly sloping phases	796	. 3
Calhoun silt loam:		
Nearly level phase	226	. 1
Very gently sloping phase	250	. 1
Calloway silt loam:		
Very gently sloping phase	750	. 3
Severely eroded gently sloping phase	102	[1]
Eroded very gently sloping phase	83	[1]
Collins silt loam	32, 710	11. 5
Collins silty clay loam	1, 369	. 5
Shallow phase	509	. 2
Collins loamy sand, overwash phase	939	. 3
Collins and Falaya silt loams, local alluvium phases	26, 422	9. 3
Commerce very fine sandy loam, nearly level phase	1, 398	. 5
Commerce silt loam, very gently sloping phase	383	. 1
Commerce silty clay loam, nearly level phase	1, 279	. 5
Dowling clay	1, 930	. 7
Dowling soils	2, 171	. 8
Dubbs very fine sandy loam:		
Very gently sloping phase	1, 681	. 6
Gently sloping phase	211	. 1
Dubbs silt loam, very gently sloping phase	291	. 1
Dundee silty clay loam:		
Nearly level phase	1, 423	. 5
Gently sloping phase	148	. 1
Very gently sloping phase	1, 186	. 4
Dundee silt loam:		
Nearly level phase	968	. 3
Very gently sloping phase	623	. 2
Dundee very fine sandy loam:		
Nearly level phase	3, 917	1. 4
Very gently sloping phase	491	. 2
Falaya silt loam	9, 648	3. 4
Falaya silty clay loam	8, 433	3. 0
Falaya and Waverly silt loams, local alluvium phases	358	. 1
Forestdale silty clay loam, nearly level phase	1, 476	. 5
Grenada silt loam:		
Eroded very gently sloping phase	4, 225	1. 5
Severely eroded gently sloping phase	10, 991	3. 9
Severely eroded sloping phase	3, 367	1. 2
Severely eroded very gently sloping phase	1, 916	. 7
Sloping phase	636	. 2
Guin gravelly sandy loam, moderately steep phase	309	. 1
Gullied land:		
Grenada soil material	7, 670	2. 7
Loring soil material	44, 744	15. 8
Henry silt loam	16	[1]
Kershaw sand, moderately steep phase	25	[1]
Lexington-Loring-Providence silt loams, eroded moderately steep phases	475	0. 2
Lintonia silt loam, eroded very gently sloping phase	441	. 2
Loring silt loam:		
Eroded very gently sloping phase	10, 065	3. 5
Eroded strongly sloping phase	1, 401	. 5
Gently sloping phase	1, 111	. 4
Moderately steep phase	553	. 2
Sloping phase	1, 838	. 6
Strongly sloping phase	1, 427	. 5
Loring silty clay loam:		
Severely eroded gently sloping phase	14, 243	5. 0
Severely eroded sloping phase	13, 745	4. 8
Severely eroded strongly sloping phase	4, 214	1. 5
Severely eroded very gently sloping phase	4, 207	1. 5
Memphis silt loam:		
Eroded very gently sloping phase	7, 666	2. 7
Eroded gently sloping phase	450	. 2
Eroded moderately steep phase	1, 994	. 7
Eroded sloping phase	118	[1]
Eroded strongly sloping phase	1, 492	. 5
Memphis silty clay loam:		
Severely eroded gently sloping phase	3, 473	1. 2
Severely eroded moderately steep phase	813	. 3
Severely eroded sloping phase	776	. 3
Severely eroded strongly sloping phase	1, 967	. 7
Severely eroded very gently sloping phase	660	. 2
Mhoon silty clay, nearly level phase	1, 166	. 4
Natchez silt loam, steep phase	1, 989	. 7
Olivier silt loam:		
Eroded very gently sloping phase	2, 758	1. 0
Nearly level phase	176	[1]
Severely eroded gently sloping phase	239	. 1
Richland silt loam:		
Very gently sloping phase	482	. 2
Eroded very gently sloping phase	2, 678	1. 0
Severely eroded gently sloping phase	1, 949	. 7
Severely eroded sloping phase	457	. 2
Severely eroded very gently sloping phase	1, 062	. 4
Robinsonville very fine sandy loam, nearly level phase	190	[1]
Sharkey clay:		
Nearly level phase	3, 066	1. 1
Level phase	1, 697	. 6
Sharkey very fine sandy loam, very gently sloping overwash phase	234	. 1
Vicksburg silt loam	3, 301	1. 1
Vicksburg and Collins silt loams, local alluvium phases	5, 171	1. 8
Waverly silty clay loam	592	. 2
Total	283, 520	100. 0

[1] Less than 0.1 percent.

Calhoun silt loam, nearly level phase (0 to 2 percent slopes) (Ca).—This soil has developed from old alluvium that was washed from loessal soils and was deposited when streams flowed at a much higher elevation than they do now. It occupies nearly level stream terraces that border the flood plains of the larger streams in the Loess Hills and is known as second-bottom or bench land. Calhoun silt loam, nearly level phase, is associated with the more sloping Calhoun silt loam, very gently sloping phase, and with better drained and less gray soils of the Olivier series. The Calhoun series is the most poorly drained member of the Lintonia-Richland-Olivier-Calhoun catena.

Native vegetation was hardwood trees, chiefly elm, post and water oak, beech, and hickory.

Profile description:

0 to 6 inches, dark grayish-brown friable silt loam; a few fine, faint grayish mottles; many small manganese concretions; strongly acid.

6 to 12 inches, light yellowish-brown, friable, light silty clay loam, faintly and finely mottled with strong brown; many manganese concretions; moderate medium to fine blocky structure; strongly acid.

12 to 48 inches, light-gray compact (fragipan) heavy silt loam; many, medium, distinct yellowish-brown mottles; a few small manganese concretions; weak medium blocky structure; strongly acid.

If this soil is cultivated, the organic matter is rapidly lost from the surface layer and it becomes lighter in color. The 6- to 12-inch layer varies from yellowish brown to gray, and the depths to the fragipan range from 8 to 15 inches.

Use and management.—Most areas of this soil have been cleared and are used for crops, some are still in hardwood forest, and a small acreage is idle. Cultivated areas are used primarily for pasture and hay; some lespedeza, sorghum, cotton, and corn are also grown. Yields are fair to poor for most crops other than pasture or hay.

Lime and fertilizers are required for high yields. Drainage ditches must be provided to remove excessive surface water. This soil is in capability unit 26.

Calhoun silt loam, very gently sloping phase (2 to 5 percent slopes) (Cb).—This soil differs from Calhoun silt loam, nearly level phase, mainly in having stronger slopes, a more variable relief, and a somewhat thinner surface layer. Because of the stronger slopes, it has better surface drainage but is more eroded than the nearly level phase. Calhoun silt loam, very gently sloping phase, is associated with Olivier soils, but it is more poorly drained.

This soil has a grayish-brown surface layer, a light yellowish-brown subsoil, and a light-gray fragipan at depths of 8 to 15 inches. Many small manganese concretions are scattered throughout the profile. Included are a few small scattered eroded areas that have surface layers 2 to 5 inches thick.

Use and management.—Most of this soil has been cleared and is used for crops; part of it is idle. Pasture plants and hay are the main crops, but some acreage is used for lespedeza, sorghum, cotton, and corn. Yields are poor for most row crops. Good management includes proper fertilizing and liming and adequate drainage to remove excess water without causing the soil to erode. This soil is in capability unit 26.

Calloway silt loam, eroded very gently sloping phase (2 to 5 percent slopes) (Cd).—This somewhat poorly drained soil has developed in deep loess. It occupies uplands and is mainly in the northeastern part of the county. This soil is associated with other phases of Calloway soils and with soils of the Grenada and Henry series. It differs from Grenada soils in containing more manganese concretions throughout the profile and from the Henry soils in color of its surface soil and in having somewhat better drainage.

From 2 to 5 inches of the original surface soil has been lost through sheet erosion, and a few small gullies or rills have formed. The soil is low in content of plant nutrients; consequently, yields of crops are also low.

Profile description:

0 to 5 inches, dark yellowish-brown friable silt loam; a few small manganese concretions; weak fine granular structure; strongly acid.

5 to 14 inches, yellowish-brown to light yellowish-brown, friable, heavy silt loam; numerous distinct mottles of dark brown; a few small manganese concretions; weak medium to fine blocky structure; strongly acid.

14 to 42 inches, light-gray compact silt loam (fragipan); many prominent, coarse, strong-brown mottles; numerous manganese concretions; massive structure; strongly acid.

42 inches +, yellowish-brown to light yellowish-brown friable silt loam; contains common, distinct, medium, dark yellowish-brown and white mottles in places; many small manganese concretions; strongly acid.

The dark-brown manganese concretions are on the surface and throughout the profile, and they are especially noticeable where the soil has been cultivated. The depths to fragipan usually range from 12 to 20 inches. In many areas the surface layer has been mixed with some of the subsoil by cultivation and is yellowish brown. Included are a few small severely eroded areas that have lost most of the original surface layer and in places part of the subsoil.

Use and management.—All of this soil has been cleared, and most is used for crops. Some of it is idle. It is used mainly for pasture and lespedeza hay; some cotton and corn are also grown. The chief management problems are control of runoff and supplying adequate amounts of lime and fertilizers. This soil is in capability unit 14.

Calloway silt loam, severely eroded gently sloping phase (5 to 8 percent slopes) (Ce).—This somewhat poorly drained soil has developed in deep loess on long narrow slopes. It differs from the eroded very gently sloping phase of Calloway silt loam in erosion and slopes. It is associated with other phases of Calloway soils, with the better drained Grenada soils, and with the more poorly drained Henry soils.

Erosion has removed most of the original surface layer and in places part of the subsoil and has exposed the yellowish-brown to light yellowish-brown subsoil. The loss of most or all of the original surface layer has reduced the water-absorption rate and water-holding capacity. Average depths to the fragipan are less on this soil than on the other Calloway soils. Many manganese concretions occur on the surface and throughout the profile of this soil.

Use and management.—All of this soil has been cleared and used for cotton, corn, and pasture; about half the acreage is now idle. Yields of crops and forage are often low. Proper management consists of controlling soil erosion and producing close-growing crops for hay, pasture, or soil improvement. Lime and fertilizers should be applied as needed. This soil is in capability unit 23.

Calloway silt loam, very gently sloping phase (2 to 5 percent slopes) (Cc).—This somewhat poorly drained soil of the uplands developed from deep loess. It differs from the eroded very gently sloping phase primarily in being

less eroded. The surface layer is, consequently, thicker, and it is grayish brown rather than yellowish brown. The fragipan is at somewhat greater depths than in the eroded very gently sloping phase of Calloway silt loam. Associated with this soil are other phases of the Calloway series, as well as the moderately well-drained Grenada soils and the poorly drained Henry soils. A few widely scattered areas having slopes that are less than 2 percent are included with this soil.

Use and management.—Nearly all of this soil has been cleared and is used for pasture and hay. Some cotton and corn are also grown, and a few areas are idle. Yields of most crops are low. Proper management includes adequate drainage of the surface, prevention of erosion, and applications of moderate amounts of fertilizers and lime. This soil is in capability unit 14.

Collins silt loam (0 to 2 percent slopes) (Cg).—This moderately well drained to somewhat poorly drained soil of the bottoms was derived from recent silty alluvium that washed from loess soils. It occupies nearly level flood plains that border streams in the Loess Hills. It occurs in association with other soils of the Collins series and with the soils of the better drained Vicksburg series, and the more poorly drained Falaya series.

Collins silt loam is extensive, occurs in relatively large areas, and is very important to agriculture. It is moderately fertile and has a favorable moisture-holding capacity. Yields of crops are usually good. Floods cover many areas of this soil, but seldom damage crops because they occur in the winter or early spring. Excessive moisture may delay spring planting in some areas.

The native vegetation consisted mainly of water-loving oaks, pin oak, hickory, ash, elm, and gum, and an undergrowth of switch cane and vines.

Profile description:

0 to 6 inches, pale-brown to brown friable fine granular silt loam; medium acid.

6 to 18 inches, brown very friable fine granular silt loam; some dark-brown splotches; medium acid.

18 to 42 inches, dark grayish-brown friable silt loam; numerous dark yellowish-brown splotches and some medium, faint, pale-brown mottles; contains some small dark-brown concretions; essentially structureless; slightly acid.

In places the color of the surface layer tends toward yellowish-brown and mottles in the subsoil are yellow and gray. Texture of the 18- to 42-inch layer ranges from silt loam to silty clay loam in some places.

A few small areas that have textures of mixed sand and silt are included in this unit. They are mostly in the southeastern part of the county. Also included are a few widely scattered areas with slopes of 2 to 5 percent.

Use and management.—Nearly all of this soil has been cleared and is used continuously for cotton, corn, soybeans, sorghum, cowpeas, pasture, and hay. Except in wet years, yields of crops are good if the soil is protected from damaging overflows, adequately drained, and properly fertilized and limed. The soil is in capability unit 5.

Collins silty clay loam (0 to 2 percent slopes) (Ch).—This moderately well drained to somewhat poorly drained soil occurs in Loess Hills. It occupies nearly level areas of wide flood plains along the Coldwater River and lower Camp Creek. It is closely associated with Collins silt loam and differs from it mainly in having a darker brown and a finer textured surface soil. It is also associated with the Falaya soils, from which it differs in being better drained.

Included with this soil is an area below the Arkabutla Reservoir that has a somewhat finer textured surface soil.

Use and management.—About 75 percent of this soil is in a hardwood forest; the rest is used mainly for cotton, corn, soybeans, sorghum, and hay. Good yields may be expected from this soil if it is protected from damaging overflows, adequately drained, and properly fertilized and limed. The soil is in capability unit 5.

Collins silty clay loam, shallow phase (0 to 2 percent slopes) (Ck).—This soil occurs on the flood plains of small streams that flow from the Loess Hills into the eastern edge of the Mississippi River Alluvial Plain. The parent material of this soil consisted mainly of silty material that washed from the Loess Hills. It also contained in places a mixture of silt and finer textured material that was washed from the Mississippi River Alluvial Plain and was deposited over slackwater clay. The clay ordinarily occurs at depths ranging from 12 to 30 inches, but in some places it is at a depth of 36 inches. The movement of water is retarded by this clay, but the drainage is sufficient to obtain good yields of crops.

This mapping unit includes some small areas with a silt loam surface soil that is more friable and somewhat easier to till than the silty clay loam. Some of these areas are half a mile northeast and east of Walls; others are near the Tunica County line on Whites Creek.

Use and management.—Most of this soil has been cleared and is used primarily for cotton and corn. Soybeans, sorghum, hay, and grasses are also grown. A few areas are in hardwood forest. This soil needs protection from overflow, adequate surface drainage, and proper fertilization and liming. It is in capability unit 5.

Collins loamy sand, overwash phase (0 to 2 percent slopes) (Cf).—This moderately well drained to somewhat poorly drained soil occurs in long narrow areas bordering the larger streams in the Loess Hills, chiefly in the eastern and southeastern parts of the county. It consists of a layer of sandy alluvium washed from Coastal Plain material and silty alluvium washed from soils of loess origin. The sandy layer ordinarily is less than 12 inches in thickness but is thicker in spots. The small sandier areas are somewhat excessively drained in places and deep enough to be unproductive.

Included with this unit are small areas that have a silt loam surface texture.

Use and management.—Nearly all of this soil has been cleared and is used mainly for pasture. Some corn, cotton, and hay are also grown. A small part is idle. The soil needs drainage, fertilizers, and lime, as well as protection from damaging overflow. Usually the main streams in these areas are filled with sand. This causes them to overflow and deposit sandy material on the surrounding soil. This soil is in capability unit 5.

Collins and Falaya silt loams, local alluvium phases (0 to 2 percent slopes) (Cl).—This undifferentiated mapping unit consists of silty local alluvium washed from soils that have developed in acid loess. It occurs along narrow drainageways, in upland depressions, and at the foot of the slopes bordering the flood plains. These soils are in small but numerous areas throughout the Loess Hills. They are subject to periodic flooding, but this seldom occurs during the summer season. Many areas consist only of Collins soils; others consist of the Falaya

soils. Both soils may occur in some places in the same delineation. Collins soils are better drained than Falaya soils. The Collins and Falaya soil profiles are described elsewhere in this section.

A few areas of minor extent in the eastern part of the county have sandy material in the profile, primarily at the surface. The slopes of a few areas are in the range of 5 to 8 percent.

Use and management.—Most of this soil has been cleared and is used mainly for cotton and corn; some of the acreage is used for pasture and hay. For highest yields, this soil needs to be adequately drained, protected from flooding, and properly fertilized and limed. It is in capability unit 5.

Commerce very fine sandy loam, nearly level phase (½ to 2 percent slopes) (Co).—This moderately well drained soil has developed from recent alluvium deposited by the Mississippi River. It occurs along the western edge of the Mississippi River Alluvial Plain near the present channel of the river. It occupies nearly level areas on recent natural levees in association with the Robinsonville and Mhoon soils. It is lighter in color, has a coarser texture, and is better drained than the Mhoon soils. It closely resembles the Robinsonville soils, but it is not so well drained. Its moderate to high inherent fertility, ease of tillage, and favorable moisture-holding capacity make it a very desirable soil for crops.

The native vegetation consisted of red, willow, and overcup oaks, hickory, ash, elm, maple, red gum, tupelo-gum, cottonwood, and a dense undergrowth of vines and canes.

Profile description:

0 to 8 inches, grayish-brown very friable very fine sandy loam; weak crumb structure; neutral in reaction.

8 to 28 inches, dark-brown friable silt loam mottled with common, medium, distinct areas of pale brown and dark yellowish-brown; essentially structureless; mildly alkaline.

28 to 32 inches, brown, very friable, very fine sandy loam; structureless; mildly alkaline.

32 to 42 inches +, grayish-brown friable silt loam mottled with common, coarse, distinct areas of dark brown; structureless; mildly alkaline.

Variations are mainly those of arrangement and thickness of soil layers and of depth to and degree of mottling. A few scattered small areas included with this soil have the texture of silt loam, and a few other areas near Penton are very gently sloping.

Use and management.—All areas that are protected by the flood-control levee have been cleared and are cultivated. Although they are subject to periodic flooding, some additional areas between the river and the levee have been cleared and are in cultivation. The soil is used mainly for cotton but also for corn, soybeans, small grain, hay, and pasture.

Crops other than legumes respond to moderate to heavy applications of nitrogen.

The unprotected areas are seldom flooded during the cropping season, but planting may often be delayed in spring. Crops are damaged or destroyed by water about one year in ten. The soil is in capability unit 1.

Commerce silt loam, very gently sloping phase (2 to 5 percent slopes) (Cm).—This moderately well drained soil occurs along present or recent channels of the Mississippi River in the western part of the alluvial plain. It occupies recent natural levees in close association with other phases of Commerce soils and with the soils of the Robinsonville and the Mhoon series. This soil differs from Commerce very fine sandy loam, nearly level phase, mainly in having a finer textured surface soil, stronger slopes, and more variable relief. It differs from the Robinsonville soils in being less well drained and from the Mhoon soils in being better drained. The surface drainage of this soil is good. Some soil is lost in heavy rains, but erosion is not a major problem.

Included with this soil is a small area west of Penton that has slopes of about 7 percent. The surface drainage is slightly more rapid on this area.

Use and management.—All of this soil has been cleared and is used mainly for cotton. It is used to some extent for corn, soybeans, small grain, hay, and pasture. Winter legumes—vetch and burclover—are frequently grown as green manure. The natural fertility of this soil is high, and crops other than legumes respond only to moderate to heavy applications of nitrogen.

Although erosion is not a major problem, contour tillage is commonly practiced, especially on the stronger slopes. Crops grown on areas unprotected by the flood-control levee are occasionally damaged by overflow. This soil is in capability unit 2.

Commerce silty clay loam, nearly level phase (½ to 2 percent slopes) (Cn).—This moderately well drained alluvial soil occupies recent natural levees of the Mississippi River in the western edge of the Mississippi River Alluvial Plain. It occurs in close association with other phases of Commerce soils and with soils of the Robinsonville and the Mhoon series.

Included with this soil are areas that have light silty clay surface soils. A few other areas are included that have slopes up to 5 percent.

Use and management.—All of this soil has been cleared and is used mainly for cotton. Some corn, soybeans, small grain, and hay are also grown.

Crops other than legumes respond to moderate to heavy applications of nitrogen. Summer legumes and winter cover crops—vetch and Austrian peas—help to improve soil tilth and maintain organic matter. Some surface drainage is required on the more nearly level areas. Rows should be designed to carry water to a ditch or outlet.

A few small cultivated areas unprotected by the levee are subject to periodic overflow. Crops are damaged about one year in ten. This soil is in capability unit 8.

Dowling clay (0 to 2 percent slopes) (Da).—This poorly drained soil has developed mainly from fine-textured sediments deposited by the Mississippi River but to some extent from local alluvium washed from adjoining soils. It occurs in depressions in close association with the Alligator and the Sharkey soils and with the finer textured soils both of the old and the recent natural levees. It differs from these associated soils mainly by being situated in low, nearly level depressions.

Dowling clay has very slow runoff and is often ponded; it has very slow internal drainage. During wet seasons water covers many areas of this soil for long periods. The inherent fertility of this soil is high, but its fine texture and poor drainage keep it from being highly productive. The clay allows tillage only within a narrow moisture range.

The native vegetation consisted mainly of cypress, tupelo-gum, willow, swampgrass, briers, and vines.

Profile description:

0 to 4 inches, dark-gray very firm clay; plastic when wet, hard when dry; medium to fine granular structure; slightly acid.
4 to 26 inches, dark-gray very firm clay faintly mottled with dark brown, gray and yellow; plastic when wet, hard when dry; massive to weak coarse blocky structure; slightly acid.
26 to 42 inches, dark-gray very firm clay; many coarse, prominent mottles of yellowish red; plastic when wet, hard when dry; massive structure; slightly acid.

Some widely scattered areas have a silty clay surface soil and a gray subsoil in which the splotches occur at less depth.

Use and management.—Some of this soil is still in forest, but most of it has been cleared and is used mainly for cotton, soybeans, corn, and small grain. Long narrow areas are used for the same crops as the adjacent soils. Some hay is also grown. Pasture sod is difficult to maintain during seasons of floods. Adequate drainage and the planting, tilling, and harvesting of crops during the short season after spring floods recede are management problems. The depressed areas occupied by these soils are often used for drainage ditches because they are the lowest places in fields. This soil is in capability unit 24.

Dowling soils (0 to 2 percent slopes) (Db).—This mapping unit consists of alluvium deposited by the Mississippi River and of local alluvium that washed from the Beulah, Bosket, Dubbs, Dundee, Robinsonville, and Commerce soils. Dowling soils occupy depressions of former stream channels or drainageways and are poorly drained. They are associated with Dowling clay but differ in having surface-soil textures that range from very fine sandy loam to clay and that are so intricately mixed that they cannot be feasibly mapped separately. During wet seasons many areas of Dowling soils are covered by water for long periods.

The native vegetation consisted of cypress, gum, swampgrass, briers, and vines.

Profile description:

0 to 5 inches, dark grayish-brown friable to very firm clay to very fine sandy loam; moderate to medium fine granular structure; slightly acid.
5 to 24 inches, light-gray friable to very firm clay to very fine sandy loam faintly mottled with yellowish-brown; massive to weak coarse blocky structure; medium acid to neutral.
24 to 42 inches+, grayish-brown very firm clay faintly mottled with yellowish brown; plastic when wet, very hard when dry; massive structure; medium acid to neutral.

The 24- to 42-inch layer is usually several feet thick. Included with this mapping unit are a few somewhat poorly drained areas that are associated with better drained soils.

Use and management.—Most of these soils have been cleared and are used mainly for cotton and corn. Some of the acreage is used for soybeans, hay, and pasture, and some is still in hardwood forest. The long narrow areas of these soils are commonly used for the same crops as the adjacent soils.

Adequate surface drainage is difficult to obtain on these soils. Ordinarily, Dowling soils are more fertile than the adjacent soils, but crops other than legumes get moderate applications of nitrogen. Crops that mature within a short growing season are best suited to these soils. The depressions occupied by Dowling soils frequently are used for the location of drainage ditches. These soils are in capability unit 17.

Dubbs very fine sandy loam, very gently sloping phase (2 to 5 percent slopes) (Dd).—This well-drained alluvial soil is on old natural terraces of the Mississippi River Alluvial Plain. It has developed from stratified beds of coarse- and fine-textured sediments deposited by the Mississippi River. This soil has more profile development than the associated Beulah, Bosket, Dundee, and Forestdale soils. The Dubbs soil is not as excessively drained as the Beulah soils, but it is better drained than the Dundee or the Forestdale soils. It has more horizon differentiation and a finer textured subsoil than the Bosket or Beulah soils.

This soil has medium runoff and moderate internal drainage. It is easily penetrated by plant roots; the moisture-holding capacity is good. Organic matter in the surface layer is fairly high when the soil is first cleared, but it is lost rapidly under cultivation unless management is good.

The native vegetation consisted chiefly of red, overcup, swamp chestnut, willow, and live oaks, hickory, maple, tupelo-gum, red gum, and ash. There was a heavy undergrowth of brush, canes, briers, and vines.

Profile description:

0 to 6 inches, grayish-brown very friable very fine sandy loam; weak crumb structure; slightly acid.
6 to 15 inches, dark grayish-brown firm to friable silty clay to silty clay loam; moderate medium subangular blocky structure; slightly acid.
15 to 24 inches, dark yellowish-brown friable silty clay loam; weak medium to fine subangular blocky structure; slightly acid.
24 to 42 inches+, dark-brown to brown very friable very fine sandy loam; single grain structure; slightly acid.

In places the texture of the 6- to 15-inch layer is sandy clay or sandy clay loam; the color of this layer ranges from dark grayish-brown to yellowish-brown. Texture of the 15- to 24-inch layer ranges from silty clay loam to sandy clay loam, and that of the 24- to 42-inch ranges from very fine sandy loam to sandy loam.

This phase of Dubbs soils contains a few nearly level areas west of Walls and east of Lake Cormorant that were too small to be mapped separately.

Use and management.—All this soil has been cleared and is used mainly for cotton. Some of the acreage is used for corn, soybeans, small grain, hay, and pasture. Most farmers cultivate along the contour to help prevent erosion. Moderate to heavy applications of nitrogen are given to crops other than legumes. Some lime is applied. Winter cover crops—vetch, Austrian peas, and burclover—are grown as green-manure crops. This soil is in capability unit 2.

Dubbs very fine sandy loam, gently sloping phase (5 to 8 percent slopes) (De).—This soil is on old natural levees of the Mississippi River Alluvial Plain. It differs from the very gently sloping phase of Dubbs very fine sandy loam in that it occupies longer and narrower strips and is more variable in relief. In addition, it has more sheet erosion because of more rapid runoff from the stronger slopes. As a result, the surface layer is somewhat thinner. Dubbs very fine sandy loam, gently sloping phase, is associated with other phases of Dubbs soils and with the Beulah, Bosket, Dundee, and Forestdale soils.

Some scattered areas, mainly in the vicinity of Glover, have a silt loam surface soil. These variations are too small and too intricately mixed to be mapped separately.

Use and management.—All this soil has been cleared and is used mainly for cotton. Some of the acreage is also

used for corn, soybeans, hay, and pasture. This soil is productive. It is easily tilled within a wide range of moisture content.′ Most farmers cultivate along the contour to prevent erosion and conserve moisture. Most crops require moderate to heavy applications of nitrogen and some lime for highest yields. Winter cover crops of vetch, crimson clover, and burclover are commonly grown as green manure. The soil is in capability unit 9.

Dubbs silt loam, very gently sloping phase (2 to 5 percent slopes) (Dc).—This well-drained soil occurs on old natural levees in association with the other phases of the Dubbs soils and with the Beulah, Bosket, Dundee, and Forestdale soils. It differs from Dubbs very fine sandy loam, very gently sloping phase, primarily in having a finer textured surface layer. This surface layer is slightly less porous, has a little more runoff, and forms more of a crust after a hard rain than the very fine sandy loam surface layer.

Use and management.—All this soil has been cleared and is used almost continuously for row crops. Cotton is grown on about 75 percent of the acreage, but the soil is also used for corn, small grain, hay, and pasture.

Inherent fertility is moderate to high, and yields are good if the soil is properly managed. The management of this soil is similar to that of the very fine sandy loam, very gently sloping phase. The crust formed on the surface after rains delays the growth of seedlings. This soil is in capability unit 2.

Dundee silty clay loam, nearly level phase (½ to 2 percent slopes) (Dh).—This moderately well drained soil has developed from medium-textured sediments deposited by the Mississippi River. It occurs on old natural levees in association with other Dundee soils and with the Beulah, Bosket, Dubbs, and Forestdale soils. Dundee silty clay loam, nearly level phase, is not so well drained as Beulah, Bosket, or Dubbs, but it is better drained than Forestdale. It is somewhat finer textured throughout the profile than the Dundee very fine sandy loams and the Dundee silt loams.

The native vegetation on this soil consisted of nearly the same species as listed for Dundee very fine sandy loam, nearly level phase.

Profile description:

0 to 6 inches, brown friable silty clay loam; weak crumb or granular structure; medium to strongly acid.

6 to 17 inches, brown, firm silty clay; distinct fine to medium mottles of yellowish brown; plastic when wet, hard when dry; weak medium subangular blocky structure; strongly acid.

17 to 26 inches, pale-brown firm to friable heavy silty clay loam; distinct fine to medium mottles of yellowish brown; weak medium subangular blocky structure; strongly acid.

26 to 40 inches +, pale-brown friable silt loam to sandy clay loam; distinct, medium, dark mottles of yellowish brown; strongly acid.

A few areas have a silty clay surface soil. The 17- to 26-inch layer extends to depths of about 32 inches in some places.

Use and management.—Nearly all of Dundee silty clay loam, nearly level phase, has been cleared and is used mainly for corn. The soil is also used for soybeans, small grain, hay, and pasture. Winter cover crops are hard to grow because the soil is under water for short periods during the winter months.

This soil is moderately fertile, and yields of crops are good under proper management. Crops other than legumes get moderate to heavy applications of nitrogen; lime is applied by many farmers. Good management also includes drainage and the prompt removal of local floodwaters from the surface. The moisture range for good tillage is somewhat more limited than it is for the coarser textured phases of Dundee soils. This soil should not be tilled when it is too wet. It is in land capability unit 8.

Dundee silty clay loam, gently sloping phase (5 to 8 percent slopes) (Dl).—This moderately well drained soil developed from medium-textured sediments deposited by the Mississippi River. It occurs on old natural levees as narrow strips widely scattered over the Mississippi River Alluvial Plain. This phase differs from Dundee silty clay loam, nearly level phase, primarily in slope. The stronger slope causes more rapid runoff and greater loss of surface soil through erosion.

Included with this soil are a few scattered areas that have a silty clay surface soil.

Use and management.—Nearly all of Dundee silty clay loam, gently sloping phase, has been cleared and is used mainly for cotton. The soil is also used for corn, soybeans, hay, and pasture.

Crops other than legumes get moderate to heavy applications of nitrogen. Some lime is applied by many farmers. The moisture range for good tillage is more limited on this soil than on the coarser textured types of Dundee soils. Erosion is a problem and all cultivation should be along the contour. Close-growing crops for hay, pasture, or soil improvement should be grown. This soil is in capability unit 12.

Dundee silty clay loam, very gently sloping phase (2 to 5 percent slopes) (Dk).—This moderately well drained soil has formed from medium-textured sediments deposited by the Mississippi River. It occupies old natural levees on the Mississippi River Alluvial Plain. It is associated with other Dundee soils and with other soils of the old natural levees. It differs from Dundee silty clay loam, nearly level phase, mainly by having stronger slopes and more variable relief. The more rapid runoff from the stronger slopes has caused sheet erosion and has slightly reduced the thickness of the surface layer. In a few areas, the surface soil is silty clay.

Use and management.—Nearly all of Dundee silty clay loam, very gently sloping phase, has been cleared and is used mainly for cotton. The soil is also used for corn, soybeans, small grain, hay, and pasture. Management of this soil is much like that of the nearly level phase of Dundee silty clay loam. However, the surface drainage is less difficult on this phase. Many farmers cultivate this soil along the contour. Winter cover crops of vetch and Austrian peas can be grown more successfully on this soil than on the nearly level phase of Dundee silty clay loam because the surface drainage is better. This soil is in capability unit 12.

Dundee silt loam, nearly level phase (½ to 2 percent slopes) (Df).—This moderately well drained soil is on the Mississippi River Alluvial Plain. It occupies rather broad uniform areas in association with other Dundee soils and with other soils on the old natural levees. It differs from Dundee very fine sandy loam, nearly level phase, mainly in texture of the surface soil. The silt loam surface soil is ordinarily not quite as porous as the very fine sandy loam and may require a little more surface drainage. The B horizon is silty clay, and it retards somewhat the movement of water through the soil. It does not seriously

restrict root growth. The soil is suitable for plants that have moderately deep and deep roots.

Use and management.—All this soil has been cleared, and cotton is grown on about 65 percent of the acreage. The rest of the acreage is used for corn, small grain, soybeans, hay, and pasture. The soil is moderately fertile, but crops other than legumes require moderate to heavy applications of nitrogen and some lime for highest yields. Surface drainage is obtained by the use of shallow ditches. The soil is in capability unit 1.

Dundee silt loam, very gently sloping phase (2 to 5 percent slopes) (Dg).—This moderately well drained soil is on the old natural levees of the Mississippi River Alluvial Plain. It is associated with other phases of Dundee soils and with the Beulah, Bosket, Dubbs, and Forestdale soils. Runoff is more rapid, and surface drainage is better than on the nearly level Dundee soils. Erosion is likely to be more rapid also, and in some places the surface soil is thinner than that of Dundee silt loam, nearly level phase.

Dundee silt loam, very gently sloping phase, has a brown friable silt loam surface soil. It has a brown slightly mottled silty clay subsoil that grades into mottled coarser textured material in the next lower layer.

This soil includes a few areas between Walls and Lake Cormorant and along Norfolk Bayou that have slopes in the range of 5 to 8 percent. Runoff is more rapid from these stronger slopes, and in places sheet-erosion damage can be seen.

Use and management.—Nearly all of Dundee silt loam, very gently sloping phase, has been cleared and is used mainly for cotton. Other uses are for corn, soybeans, hay, and pasture.

The fertility of this soil is moderately high. Crops other than legumes require only moderate to heavy applications of nitrogen and lime for highest yields. Rows should be run on gradients that help remove surface water and prevent erosion. Contour cultivation is practiced on this soil by many farmers. This soil is in capability unit 2.

Dundee very fine sandy loam, nearly level phase (½ to 2 percent slopes) (Dm).—This moderately well drained soil is on old natural levees in the Mississippi River Alluvial Plain. It developed from stratified materials that were deposited in an intermediate position on natural levees by floodwaters. This soil is well distributed over the Mississippi River Alluvial Plain; its largest areas are near the village of Lake Cormorant. It occurs in association with other phases of the Dundee soils and with the Beulah, Bosket, Dubbs, and Forestdale soils. It is not as well drained as the Beulah, Bosket, and Dubbs soils, but it is better drained than the Forestdale soils.

The native vegetation consisted of a rather dense forest of red, Spanish, overcup, and live oaks, hickory, ash, redgum, and maple and a dense growth of underbrush, briers, and canes.

Profile description:

0 to 6 inches, brown very friable very fine sandy loam; weak crumb structure; medium acid.
6 to 18 inches, brown firm sandy clay to silty clay, slightly mottled with yellowish brown; weak subangular blocky structure; medium acid.
18 to 30 inches, pale-brown firm to friable silty clay loam, distinctly mottled with yellowish brown; massive to very weak subangular blocky structure; medium to strongly acid.
30 to 42 inches +, pale-brown friable silt loam to sandy clay loam, distinctly mottled with yellowish brown; medium to strongly acid.

In some areas the 6- to 18- and the 18- to 30-inch layers are yellowish brown, mottled with gray and yellow. In others the 18- to 30- and the 30- to 42-inch layers are very fine sandy loam and prominently mottled.

Use and management.—Nearly all of Dundee, very fine sandy loam, nearly level phase, has been cleared. Cotton is grown on approximately 65 percent of the acreage. The rest is used for corn, small grain, soybeans, hay, and pasture. Winter cover crops of vetch, Austrian peas, or burclover are grown as green manure. This soil is moderately high in phosphorus and potassium, but some farmers apply fertilizer, especially potash and nitrogen, on all crops except legumes. Lime is also commonly applied to this soil. Good yields are obtained if management is good. This soil is easily tilled within a wide range of moisture conditions. It is in capability unit 1.

Dundee very fine sandy loam, very gently sloping phase (2 to 5 percent slopes) (Dn).—This moderately well drained soil has formed from sediments deposited by the Mississippi River. It occurs on the old natural levees in the Mississippi River Alluvial Plain in association with other Dundee soils and other soils of the old natural levees. It differs from Dundee very fine sandy loam, nearly level phase, mainly in having more variable relief, stronger slope, and a somewhat thinner surface layer. This soil is moderately fertile and is easily tilled. The surface drainage is good.

A few small areas that have slopes that range from 5 to 8 percent are included with this soil. These areas have more rapid runoff and more sheet erosion than the very gently sloping phase.

Use and management.—All of Dundee very fine sandy loam, very gently sloping phase, has been cleared, and most of it is used continuously for row crops. Cotton is grown on approximately 65 percent of the acreage. The rest is used for corn, small grain, soybeans, hay, and pasture. Crops other than legumes get moderate to heavy applications of nitrogen and some lime. Most cultivation is along the contour. Winter cover crops of vetch and Austrian peas are grown for green manure crops. This soil is in capability unit 2.

Falaya silt loam (½ to 2 percent slopes) (Fa).—This somewhat poorly drained soil occupies the flood plains of major streams in the Loess Hills. It has developed from silty sediments washed from loess soils. It occurs in association with the Vicksburg, Collins, and Waverly soils. It is better drained than Waverly soils and more poorly drained than the Vicksburg and Collins soils. It is sometimes flooded during long periods of wet weather.

The native vegetation consists mainly of water oaks, maple, ash, elm, blackgum, and sweetgum and an undergrowth of brush and vines.

Profile description:

0 to 10 inches, light grayish-brown to light-brown friable silt loam; some manganese concretions; medium acid.
10 to 18 inches, pale-brown friable light silty clay loam; faint medium to fine mottles of light gray; some manganese concretions; massive to weak crumb structure; strongly acid.
18 to 40 inches +, light-gray, friable, heavy silt loam; distinct large mottles of yellowish brown; massive; strongly acid.

The texture of the 10- to 18-inch layer and the 18- to 40-inch layer ranges from silt loam to silty clay. A few

areas in the eastern part of the county that have stratified layers of sand in the profile are included with this mapping unit. They are too small to be mapped separately.

Use and management.—Most of Falaya silt loam is forested. The cleared acreage is used for corn, cotton, sorghum, soybeans, hay, and pasture. The main problems are adequate drainage and protection from damaging overflow. Planting in spring may be delayed by wetness from the winter floods. Winter cover crops are difficult to grow because of the excessive wetness of the soil. Crops need moderate amounts of a complete fertilizer for good yields. This soil is in capability unit 15.

Falaya silty clay loam (½ to 2 percent slopes) (Fb).—This soil is very similar to Falaya silt loam except in texture of surface soil. The finer texture of the surface layer makes tillage somewhat more difficult than on Falaya silt loam.

Use and management.—Most of this soil is in hardwood forest. Some of the acreage has been cleared and is used for corn, cotton, soybeans, sorghum, hay, and pasture; and some is idle. Management of this soil is very similar to that of Falaya silt loam, but the moisture range for satisfactory tillage is slightly narrower. The soil is in capability unit 15.

Falaya and Waverly silt loams, local alluvium phases (½ to 2 percent slopes) (Fc).—This mapping unit consists of silty local alluvium that washed from soils developed from acid loess. The soils occupy drainageways and depressions of the uplands and the toe slopes bordering the flood plains. They are mainly in the eastern part of the county, usually in long, narrow tracts. Where both soils occur in the same area, the better drained Falaya soils occupy the outer edges and the Waverly soils occupy the center parts. Some areas do not have both soils. The soils of this mapping unit have slow to very slow runoff and internal drainage. The natural fertility is low, and fair to poor yields are to be expected.

Both Falaya and Waverly soil profiles are described elsewhere in this report.

Included with this mapping unit are a few scattered areas with slopes in the range of 2 to 5 percent. They differ from the nearly level areas mainly in having somewhat better surface drainage.

Use and management.—Most of this mapping unit is in hardwood forest. Some acreage has been cleared and is used chiefly for pasture. The soils are well suited to sorghum and lespedeza, but they are poor for cotton or corn. The low areas occupied by these soils are excellent for ditches or waterways. Fertilizer must be used to obtain fair yields of crops. The soils are in capability unit 15.

Forestdale silty clay loam, nearly level phase (½ to 2 percent slopes) (Fd).—This somewhat poorly drained to poorly drained soil has formed from alluvial sediments deposited by the Mississippi River. It occurs at the lowest elevation on the old natural levee formation in association with the better drained soils of the Beulah, Bosket, Dubbs, and Dundee series. It is also associated with the soils of the Sharkey and Alligator series, and differs from them mainly in having a somewhat lighter colored surface soil and a slightly coarser textured layer in the lower part of the profile. This soil has medium to slow runoff and slow internal drainage. The soil profile is only slightly developed.

The native vegetation consists of hardwood trees such as post, white, and red oaks, hickory, maple, blackgum, and tupelo-gum, and an undergrowth of brush, vines, and briers.

Profile description:

0 to 6 inches, pale-brown friable silty clay loam; weak crumb structure; medium to strongly acid.
6 to 30 inches, light-gray firm to friable silty clay loam, mottled distinctly with common medium areas of strong brown; weak subangular blocky structure; strongly acid.
30 to 42 inches, light-gray friable silt loam to very fine sandy loam, mottled distinctly with common medium areas of strong brown; strongly acid.

Depths to the 20- to 42-inch layer range from 24 to 36 inches. Included in this mapping unit are a few scattered areas with a silty clay surface soil texture.

Use and management.—Nearly all of Forestdale silty clay loam, nearly level phase, has been cleared, and most of it is in cultivation. Cotton is grown on about half the acreage; soybeans, corn, oats, hay, and pasture are grown on the other half. Cotton yields are fair but are poor in wet years. Yields of corn are poor, but those of oats and soybeans are usually good.

Adequate drainage of the surface is important to good soil management. The frequent use of soil-improving crops helps to maintain tilth and fertility. Most nonleguminous crops need moderate to heavy applications of nitrogen; most crops need lime. This soil is in capability unit 6.

Grenada silt loam, eroded very gently sloping phase (2 to 5 percent slopes) (Ga).—This moderately well drained soil is in the Loess Hills uplands, primarily in the northeastern part of the county. It occurs in association with other phases of the Grenada series and with soils of the Loring, Calloway, and Henry series. Grenada soils differ from the Loring soils mainly in having a paler brown subsoil. In addition, the fragipan is more compact and at less depth in the profile. Grenada soils are better drained than Calloway and Henry soils and have a darker subsoil.

This soil has a fragipan at depths ranging from 20 to 30 inches. Water moves fairly well through the subsoil but slowly through the fragipan. The moisture-holding capacity is restricted. Sheet erosion has removed from 2 to 5 inches of the original surface soil, and a few deep gullies have formed in some areas.

The native vegetation consists of hardwoods such as oaks, hickory, beech, elm, gum, walnut, and maple.

Profile description:

0 to 5 inches, dark grayish-brown, friable silt loam; weak medium to fine blocky structure; strongly acid.
5 to 9 inches, dark yellowish-brown, friable, heavy silt loam; weak medium to fine blocky structure; strongly acid.
9 to 24 inches, yellowish-brown, firm to friable, silty clay loam; medium blocky structure; strongly acid; lower few inches have many distinct strong brown mottles, a few distinct firm gray mottles, and a few manganese concretions.
24 to 42 inches, light-gray, firm, compact silty clay loam (fragipan); some medium, distinct, dark yellowish-brown mottles; few manganese concretions; strongly acid.

The surface soil varies in thickness, and the compact layer occurs at depths ranging from 20 to 30 inches in a few areas where erosion has been slight.

Use and management.—Nearly all of this soil is cleared and most of it is used mainly for pasture and lespedeza. Some corn, cotton, and oats are grown.

Winter cover crops and summer legumes improve tilth and maintain organic matter on this soil. To help prevent

erosion, all cultivation should be along the contour. Close-growing crops should be used in rotation with clean cultivated crops. This soil needs complete fertilizers and lime for good crop yields. It is in capability unit 4.

Grenada silt loam, severely eroded gently sloping phase (5 to 8 percent slopes) (Gd).—This extensive soil is chiefly in the northeastern part of the county. It occurs in association with other soils of the Grenada series and with the soils of the Loring, Calloway, and Henry series. Nearly all of the original surface soil and, in places, part of the subsoil have been lost through erosion. The yellowish-brown surface soil is slightly finer textured than that of Grenada silt loam, eroded very gently sloping phase. The finer textured surface soil slows the absorption of water, and the stronger slopes increase the hazard of erosion. A few scattered moderately eroded areas are included in this unit.

Use and management.—All of Grenada silt loam, severely eroded gently sloping phase, has been cleared. It was used for clean cultivated crops at one time, but about one-fourth of the acreage is now idle. Most of the remaining acreage is used for cotton, corn, oats, hay, or pasture.

Crop rotations in which close-growing crops are grown two-thirds of the time and row crops one-third of the time help to control erosion. All cultivation should be along the contour. This soil needs lime and moderate to heavy applications of complete fertilizers for the best yields of most crops. It is in capability unit 13.

Grenada silt loam, severely eroded sloping phase (8 to 12 percent slopes) (Gf).—This soil differs from Grenada silt loam, eroded very gently sloping phase, in slopes and erosion. It also has a slightly finer textured surface soil. Most of the original surface soil and, in places, part of the subsoil have been lost through erosion. A few deep gullies not crossable by farm machinery have formed in some areas of this soil. The rapid runoff makes erosion a serious hazard.

Included in this mapping unit are one or two areas in the vicinity of Lewisburg that have slopes to nearly 17 percent.

Use and management.—All of Grenada silt loam, severely eroded sloping phase, has been cleared and used for crops. Much of it is now idle. Some cotton, corn, hay, and pasture crops are grown, but yields are generally low.

This soil should be used for hay, pasture, or pine trees. Row crops are not suggested for this soil. If grown, they should not be used more often than 1 year in 4. A balanced fertilizer and lime are needed for best production of most cultivated crops. The soil is in capability unit 22.

Grenada silt loam, severely eroded very gently sloping phase (2 to 5 percent slopes) (Gb).—This fairly extensive soil is in the northeastern part of the county. It occurs in association chiefly with other Grenada soils and with soils of the Loring, Calloway, and Henry series. Nearly all of the original surface soil and, in places, part of the subsoil have been lost through erosion. The surface soil is now a yellowish-brown, friable, heavy silt loam. Below this is the yellowish-brown heavy silt loam subsoil that has a moderate medium subangular blocky structure.

Use and management.—All of this soil has been cleared and used for cultivated crops at one time, but much of it is now idle. The areas still in cultivation are used for cotton, corn, soybeans, lespedeza, oats, and bermudagrass. Some vegetables and fruit are grown for home use.

Close-growing crops for hay, pasture, or soil improvement should be grown in a long-time rotation with clean-cultivated crops. Rows should be along the contour to help prevent erosion and to conserve moisture. This soil needs balanced fertilizers and lime for best yields of most crops. It is in capability unit 13.

Grenada silt loam, sloping phase (8 to 12 percent slopes) (Ge).—This soil is not extensive. Most of it occurs in the northeastern part of the county, but small areas are in other parts of the Loess Hills. It differs from Grenada silt loam, eroded very gently sloping phase, primarily by having stronger slopes and less erosion. The surface layer normally ranges from 5 to 8 inches in thickness, but a few areas are included with this unit that have less than 5 inches of the original surface soil left. Also included are a few areas on which slopes are slightly more than 12 percent. This soil is subject to serious erosion.

Use and management.—Practically all of Grenada silt loam, sloping phase, is in hardwood forest from which the merchantable trees have been cut. A few cleared areas are used for cotton, corn, and pasture.

Perennial sod-forming plants for hay or pasture will help control erosion on this soil. Row crops should not be grown more than 1 year in 4. Erosion can be controlled by allowing the soil to remain under a forest cover. Balanced fertilizer and lime are required for best yields of most crops. The soil is in capability unit 22.

Guin gravelly sandy loam, moderately steep phase (17+ percent slopes) (Gg).—This excessively drained soil is composed of Coastal Plain gravel, sand, and clay. There is little or no profile development. The soil occurs primarily on some of the steeper slopes that border flood plains of the larger streams in the southeastern part of the county. It is associated with the soils of the Loring series and with the Brandon–Loring and the Lexington-Loring-Providence soil complexes. Guin gravelly sandy loam, moderately steep phase, differs from Loring soils primarily in that it has formed from Coastal Plain materials rather than from loess. It differs from the Brandon-Loring and the Lexington-Loring-Providence soils by not having a layer of loess over the Coastal Plain material.

The native vegetation consists primarily of blackjack, white, red, and post oaks and some elm.

Profile description:

- 0 to 2 inches, dark grayish-brown very friable gravelly sandy loam; some dark organic stain; strongly acid; approximately 25 percent gravel.
- 2 to 9 inches, brown very friable gravelly sandy loam; single grain structure; very strongly acid; approximately 50 percent gravel.
- 9 to 24 inches, red, firm gravelly sandy clay; indefinite structure; very strongly acid; approximately 75 percent gravel.
- 24 to 53 inches, red, friable coarse sandy clay loam; very strongly acid; approximately 10 percent gravel.
- 53 inches+ red, firm to friable gravelly coarse sandy clay; very strongly acid; approximately 50 percent gravel.

A few areas in this mapping unit are eroded more than others, and there is an occasional gully.

Use and management.—The best use for this soil is for forestry or for wildlife. The soil is too steep and too low in content of plant nutrients for crop use. None of it is in cultivation at the present time. This soil is in capability unit 30.

Gullied land, Grenada soil material (5 to 20 percent slopes) (Gh).—This land type is mainly in the northern part of the county. It consists of areas that have been so badly eroded that they cannot be reclaimed except by very slow and usually expensive practices. These areas were originally Grenada soils. A few gullied areas of Grenada soils remain on the stream terraces. They have a definite fragipan at depths of 20 to 30 inches that retards the movement of water through the soil. This land type has rapid runoff and low water-holding capacity.

A large part of the surface soil and much of the subsoil have been lost through erosion. Many gullies have formed that are not crossable by farm machinery. In many places, the entire loess layer has washed away and the underlying Coastal Plain material is exposed in the bottom of the gullies.

Use and management.—All of this land type has been cleared and has been used for crops. Almost all fields have been abandoned and have grown up in broomsedge, briers, and bushes. A very few small fields are still used for cotton; some others are in pasture. Yields from this land type are poor.

Profits for the operator and protection for the soil can be obtained by planting pine trees. Planting sites in the bottom of the gullies can be provided by planting lovegrass on small detention dams in the spring, followed by the planting of pine seedlings late in fall or early in winter. This soil is in capability unit 29.

Gullied land, Loring soil material (5 to 25 percent slopes) (Gk).—This miscellaneous land type consists of eroded and gullied Loring soils. Areas of this land type are scattered over the Loess Hills. Nearly all of the surface soil and much of the subsoil have been washed away, and an intricate pattern of gullies has formed. Many of the gullies cannot be crossed by farm machinery. The soil between gullies is moderately well to well drained, and has rapid runoff and medium to rapid internal drainage. The supply of organic matter and plant nutrients is low.

Included in this unit are a few areas consisting of gullied Lexington-Loring-Providence and Brandon-Loring complexes and Lintonia silt loam.

Use and management.—All of this land type has been cleared and used for crops at one time. Most of it is now idle and has grown up in broomsedge, briers, and bushes. A few small areas are used for cotton, and a small acreage is in pasture.

This land type should be planted in perennial vegetation to control erosion. Some areas could be reclaimed by the expensive process of filling the gullies, fertilizing the smoothed-over areas, and planting perennials for hay or pasture. Kudzu probably could be established on some areas and then used for temporary or restricted grazing. Pine trees also make an excellent cover and will grow into a profitable crop. This soil is in capability unit 29.

Henry silt loam (0 to 2 percent slopes) (Ha).—This poorly drained soil occupies flat or depressed areas on loess uplands in the northeastern part of the county. It occurs in association with the Memphis, Loring, Grenada, and Calloway soils. The inherent fertility of this soil is very low; yields of most crops are poor. The water-holding capacity is very low. The soil becomes very wet during rainy seasons and very dry in dry weather. It is the most poorly drained upland soil derived from loess.

The native vegetation consists mainly of scrubby stands of post, white, and willow oaks, southern and northern red oaks, and some hickory.

Profile description:

0 to 8 inches, grayish-brown to pale-brown, friable silt loam; weak fine granular structure; strongly acid.

8 to 20 inches light, brownish-gray to white, friable, heavy silt loam (fragipan); few, fine, faint mottlings of yellowish brown; moderate fine granular structure; strongly acid.

20 to 28 inches, light-gray to white, friable, heavy silt loam; a few, fine, distinct, very dark grayish brown and dark grayish brown mottles; the very dark brown mottles are chiefly small concretions or stains from them; weak fine granular structure; strongly acid.

28 to 42 inches +, light-gray to white light silty clay loam; a few, fine, faint, yellowish brown and brownish yellow mottles; medium blocky to massive; numerous manganese concretions.

Use and management.—About two-thirds of this soil has been cleared and is used mainly for lespedeza hay and pasture. Poor drainage, low water-holding capacity, and poor natural fertility limit its use for agriculture. It is in capability unit 26.

Kershaw sand, moderately steep phase (17+ percent slopes) (Ka).—This deep excessively drained soil formed from Coastal Plain sand. It is in the south-central part of the county and occupies some of the steeper slopes bordering the flood plain of the Coldwater River. It is associated with the Guin soils, and with the Brandon-Loring and the Lexington-Loring-Providence soil complexes. It differs from the Guin soils in having sandy rather than sand, clay, and gravel parent material. The Brandon-Loring and the Lexington-Loring-Providence complexes differ from the Kershaw soil in having a mantle of loess over Coastal Plain material. Kershaw sand, moderately steep phase, has very rapid internal drainage; erosion is usually not a serious hazard. Some areas having loamy sand surface soils are included.

The native vegetation consisted primarily of red and blackjack oaks, elm, and hickory.

Profile description:

0 to 6 inches, dark reddish-brown loose loamy sand; single grain structure; medium acid.

6 to 24 inches, yellowish-red loose sand; single grain structure; strongly acid.

24 to 42 inches +, reddish-yellow loose sand; very strongly acid.

Use and management.—The cleared acreage is now idle and has grown up in broomsedge, briers, and bushes. Kudzu, pine trees, or deep-rooted perennials should be planted as a cover for this soil. It is not suitable for row crops because of its steep slopes, low level of fertility, and droughty characteristics. It is in capability unit 30.

Lexington-Loring-Providence silt loams, eroded moderately steep phases (17+ percent slopes) (La).—This complex consists of well to moderately well drained soils that occur together in a more or less uniform pattern. The Loring soils have developed from deep loess and usually are at the top of slopes. The Lexington and Providence soils have developed from a mantle of loess about 2 feet thick over Coastal Plain sand and are on the lower part of slopes. In a few spots, especially near the foot of the eroded slopes, the underlying sandy material outcrops.

The soils in this complex occur in the eastern part of the county in association with the Brandon-Loring complex and the Loring and Guin soils. They differ from the Brandon soils in having sand rather than gravel under a mantle of loess; from the Loring in having sandy material in the profile rather than all deep loess; and from

Guin primarily in having a thin mantle of loess over Coastal Plain material. Erosion over most of this complex has been only moderate, but a small cleared and cultivated area has been severely eroded and contains deep gullies. A few small areas of this complex have slopes in the range of 5 to 17 percent.

The native vegetation consists chiefly of oak, hickory, elm, sweetgum, blackgum, tulip-poplar, and beech.

Profile description of Lexington silt loam:

0 to 4 inches, brown to dark-brown, friable, heavy silt loam; weak fine granular structure; medium to strongly acid.
4 to 24 inches, brown to dark-brown friable silty clay loam; moderate medium blocky to weak fine granular structure; strongly acid.
24 to 46 inches, brown to light-brown heavy fine sandy loam or fine sandy clay; common, distinct mottles of light gray; coarse subangular blocky structure; strongly acid.
46 inches +, stratified, reddish-yellow, very friable to loose loamy sand and pale-yellow loose sand.

The thickness of all layers varies. In places the 46-inch + layer is not stratified.

Profile description of Providence silt loam:

0 to 8 inches, grayish-brown or yellowish-brown friable silt loam; strongly acid.
8 to 24 inches, yellowish-brown friable silty clay loam; slightly compact; splotched with pale yellow and gray; strongly acid.
24 to 42 inches, brownish-gray compact sandy clay, splotched with yellow, gray, and dark brown; strongly acid.
42 inches +, sandy clay or stratified sand and gravel; strongly acid.

Depth to the sandy material ranges from 18 to 40 inches.

The profile of Loring silt loam is described under Loring soils.

Use and management.—Nearly all of this complex is in a hardwood forest from which most of the merchantable trees have been cut. A small acreage was cleared and was cultivated for a time, but it is now idle. This soil is not suited to cultivation, because of the strong slopes and great risk of erosion. Some of the less steep areas could be developed into perennial pasture if grazing were properly regulated. The soil should be used for forestry. The complex is in capability unit 28.

Lintonia silt loam, eroded very gently sloping phase (2 to 5 percent slopes) (Lb).—This well-drained soil is on the stream terraces of the larger streams of the county, mainly along the Coldwater River. It has developed from old silty alluvium that washed from loess soils when the streams flowed at a much higher elevation. Lintonia soils occur in the Loess Hills in association with the Richland, Olivier, and Calhoun soils. Lintonia silt loam is better drained and does not have the fragipan that is characteristic of the associated soils. The profile is free of sand and gravel.

The native vegetation was principally oak, hickory, beech, walnut, ash, maple, dogwood, persimmon, and sassafras.

Profile description:

0 to 3 inches, dark yellowish-brown, mellow, friable silt loam; medium acid.
3 to 6 inches, dark-brown friable silt loam; medium acid.
6 to 11 inches, dark-brown, friable, heavy silt loam; weak medium blocky structure; medium acid.
11 to 30 inches, yellowish-brown to strong-brown, friable, heavy silty clay loam; medium blocky structure; medium acid.
30 to 42 inches +, dark yellowish-brown friable silt loam, mottled slightly with medium light yellowish brown; moderate medium blocky structure; medium acid.

Some profiles are not mottled; mottling as described occurs where this soil grades into the Richland soils.

Included in this mapping unit are a few very small severely eroded areas near the junction of Camp Creek and Coldwater River. In the southwestern part of the Loess Hills are a few areas with slopes ranging from 5 to 8 percent.

Use and management.—Nearly all of this soil has been cleared and is used mainly for cotton. Some of the acreage is used for corn, oats, soybeans, sorghum, hay, and pasture. Fruit and vegetables for home use are also grown.

Control of erosion and proper use of fertilizers and lime are required on this soil. Erosion can be controlled by cultivating along the contour and by growing noncultivated crops in rotation with clean cultivated crops. Winter cover crops are sometimes grown as green manure. Lime and a complete fertilizer should be applied according to needs indicated by soil tests. This soil is in capability unit 3.

Loring silt loam, eroded very gently sloping phase (2 to 5 percent slopes) (Lc).—This moderately well drained to well drained soil has developed in deep loess. It occurs in widely scattered areas in the Loess Hills. It is associated with other Loring soils and with those of the Memphis, Grenada, Calloway, and Henry series. Loring soils differ from the Memphis in having a fragipan and more mottles. They are better drained than Grenada, Calloway, or Henry soils.

Most areas of this soil have lost from 2 to 5 inches of original surface soil. The slightly compact fragipan somewhat retards movement of water through the soil. The native vegetation consisted chiefly of oak, hickory, and elm.

Profile description:

0 to 5 inches, dark yellowish-brown to brown, mellow, friable silt loam; medium acid.
5 to 10 inches, yellowish-brown friable silty clay loam; moderate medium blocky structure; strongly acid.
10 to 26 inches, strong-brown friable silty clay loam; moderate medium blocky structure; strongly acid.
26 to 32 inches, yellowish-brown firm to friable silty clay loam; numerous, distinct, medium, dark yellowish-brown and strong-brown mottles; moderate medium blocky structure; small manganese concretions; strongly acid.
32 to 48 inches, firm to friable slightly compact (fragipan) silty clay loam; prominent and numerous coarse mottles of dark yellowish brown, light yellowish brown, and distinct medium yellowish brown; moderate medium blocky structure; many small manganese concretions; strongly acid.

The depth to mottling ranges from 24 to 30 inches; the slightly compact fragipan occurs at depths ranging from 30 to 36 inches. A few small areas that have had little or no erosion are included with this soil.

Use and management.—Nearly all of this soil has been cleared and is used mainly for cotton and pasture. Corn, oats, and hay are also grown.

The control of erosion is a major problem. Cultivation along the contour and the growing of row crops in rotation with close-growing crops are practices that help control erosion. Winter cover crops and summer legumes should be grown as green manure. Fertilizer and lime are required for best yields. The quantities needed for crops should be determined by soil tests. This soil is in capability unit 3.

Loring silt loam, eroded strongly sloping phase (12 to 17 percent slopes) (Lg).—This soil differs from Loring silt loam, eroded very gently sloping phase, mainly in

slopes. Runoff is very rapid; consequently, the risk of erosion is very great. Although this soil has a forest cover, sheet erosion has removed from 2 to 5 inches of the original surface layer. Occasional gullies have formed that are not crossable with farm machinery.

Use and management.—All of this soil is in hardwood forest from which most of the merchantable trees have been cut. Because it tends to erode badly, this soil is suited only to a permanent vegetation. Much of it could be used for pasture if a good sod of perennial plants could be developed. The need for lime and fertilizer on pastures should be determined by testing the soil. The soil is in capability unit 27.

Loring silt loam, gently sloping phase (5 to 8 percent slopes) (Ld).—This soil differs from the Loring silt loam, eroded very gently sloping phase, in slope and in having a thicker surface soil. Included in this unit are a few scattered areas that have lost 2 to 5 inches of the original surface soil through sheet erosion.

Use and management.—Nearly all of this soil is in hardwood forest from which most of the merchantable trees have been cut. A small acreage has been cleared and is used for cotton, corn, hay, and pasture.

This soil can be used for cultivated crops if it is protected from erosion. Row crops grown in a rotation with close-growing crops for grain, hay, pasture, or soil improvement are suggested. The proper quantity of fertilizer and lime for highest yields should be determined by soil tests. The soil is in capability unit 11.

Loring silt loam, moderately steep phase (17+ percent slopes) (Lh).—This soil occurs mainly in the western part of the Loess Hills. It differs from Loring silt loam, eroded very gently sloping phase, in having stronger slopes and a thicker surface layer. Most of this soil is only slightly eroded, but some areas have lost from 2 to 5 inches of the original surface soil. Runoff is very rapid, consequently, the risk of erosion is very great.

Use and management.—All of this soil is in a hardwood forest from which most of the merchantable trees have been cut. The soil is suited best for forestry because of the strong slopes and erosion hazard. It is in capability unit 28.

Loring silt loam, sloping phase (8 to 12 percent slopes) (Le).—This soil differs from the Loring silt loam, eroded very gently sloping phase, in slopes and thickness of surface soil. The risk of erosion also is greater. Where this soil is under a forest cover, very little of it is damaged by sheet erosion. However, a few forested areas have lost from 2 to 5 inches of the original surface soil.

Use and management.—Nearly all of this soil is in hardwood forest from which most of the merchantable trees have been cut. A few areas are in pasture.

The risk of erosion makes this soil unsuitable for continuous cultivation. Row crops should be grown in a long rotation with close-growing crops. The best use for this soil is for close-growing crops grown for hay, pasture, or soil improvement. It is also suitable for forestry. Fertilizers and lime are required for best yields of most crops. This soil is in capability unit 21.

Loring silt loam, strongly sloping phase (12 to 17 percent slopes) (Lf).—This soil occurs in large areas over most of the Loess Hills. It is very similar to Loring silt loam, eroded very gently sloping phase, in profile, but it is eroded less and has stronger slopes. Surface runoff is very rapid, and the risk of erosion is high. Because of its forest cover, nearly all of this soil is only slightly eroded. There are, however, a few small eroded areas that have lost from 2 to 5 inches of the original surface soil.

Use and management.—This soil is covered by a forest from which almost all the merchantable trees have been cut. It is suited best for forestry and is in capability unit 27.

Loring silty clay loam, severely eroded gently sloping phase (5 to 8 percent slopes) (Ll).—This soil is in widely scattered areas in the Loess Hills. It differs from Loring silt loam, eroded very gently sloping phase, mainly in texture of the surface layer, in degree of erosion, and in slopes. In places the original surface layer and a part of the subsoil have been lost through erosion and the yellowish-brown to strong-brown silty clay loam subsoil is now the surface layer. An occasional gully has formed that is not crossable by heavy farm machinery.

Use and management.—All of this soil has been cleared and used for crops. Many areas are now idle and have grown up in bushes, briers, and broomsedge. Some acreage is still used for cotton, corn, oats, and pasture; yields are usually rather low.

The control of erosion is a problem on this soil. Although row crops can be grown in suitable rotation, the soil is best suited to close-growing crops for hay, pasture, or soil improvement. Gullies require stabilization. Fertilizers and lime should be applied according to the results of soil tests. This soil is in capability unit 10.

Loring silty clay loam, severely eroded sloping phase (8 to 12 percent slopes) (Lm).—This soil occurs throughout most of the Loess Hills. It resembles Loring silt loam, eroded very gently sloping phase, except in slopes and in texture of the surface soil. It has lost nearly all of the original silt loam surface soil and, in places, part of the subsoil as a result of sheet erosion. A few deep gullies not crossable with farm machinery have formed in some areas.

Use and management.—All of this soil has been cleared and used for clean-cultivated crops. Much of it is now idle, but some of the acreage is used for cotton, corn, hay, or pasture.

The control of erosion is the chief management problem. Row crops are not well suited and should not be grown except in long rotations with close-growing crops. The soil is best suited to forestry or to close-growing crops grown for hay, pasture, or soil improvement. Lime and fertilizer requirements should be determined by testing the soil. The soil is in capability unit 21.

Loring silty clay loam, severely eroded strongly sloping phase (12 to 17 percent slopes) (Ln).—This fairly extensive soil is in scattered areas throughout the Loess Hills. It has a finer surface soil texture and much stronger slopes than Loring silt loam, eroded very gently sloping phase. The erosion hazard is very great. Nearly all of the original silt loam surface soil and, in places, part of the subsoil have been lost through sheet erosion, and the silty clay loam subsoil is now exposed. Occasional deep gullies not crossable by farm machinery have formed in some areas.

Use and management.—All of this soil has been cleared and used for crops, but most of it is now idle. Some areas are still used for cotton and corn; others are used for hay and pasture.

This soil should be kept in permanent vegetation such as bermudagrass, lespedeza, kudzu, or trees. Slopes are too steep for row crops. Fertilizers and lime are essential

for best yields of pasture and sod-forming plants. This soil is in capability unit 27.

Loring silty clay loam, severely eroded very gently sloping phase (2 to 5 percent slopes) (Lk).—This soil differs from Loring silt loam, eroded very gently sloping phase, in having a darker brown and finer textured surface layer and in having generally less depth to the fragipan. Nearly all of the original surface layer and, in places, part of the subsoil have been lost through erosion. A few deep gullies not crossable with farm machinery have formed in some of the areas.

Use and management.—All of this soil has been used for crops; some of it is now idle. Crops commonly grown are cotton, corn, oats, hay, and grasses. Fruits and vegetables are grown for home use.

The control of erosion is a major problem. Cultivation along the contour and the growing of row crops in rotation with close-growing crops are good practices. Complete fertilizers and lime are required for highest yields of most crops. This soil is in capability unit 10.

Memphis silt loam, eroded very gently sloping phase (2 to 5 percent slopes) (Ma).—This well-drained soil has developed from deep loess. It occupies long narrow areas in the western part of the Loess Hills. It occurs in association with the Natchez, Loring, and Grenada soils. Natchez soils are somewhat excessively drained and less well developed than this soil and other Memphis soils; Loring and Grenada soils are less well drained. The water-holding capacity of Memphis silt loam, eroded very gently sloping phase, is good.

The native vegetation consisted mainly of oak, beech, hickory, sweetgum, black locust, and yellow-poplar.

Profile description:

0 to 5 inches, brown to dark yellowish-brown friable silt loam; weak crumb structure; strongly acid.
5 to 24 inches, dark-brown to strong-brown friable silty clay loam; moderate medium to fine blocky structure; strongly acid.
24 to 35 inches, dark yellowish-brown friable light silty clay loam; weak blocky structure; strongly acid.
35 to 50 inches, dark yellowish-brown friable light silty clay loam; a few, fine, distinct, pale-brown mottles and some grayish silt coatings on the structural faces, root channels, and cracks; a few small manganese concretions; weak blocky structure; strongly acid.
50 to 100 inches, strong-brown friable silt loam distinctly mottled with medium to fine areas of very pale brown and dark yellowish brown; massive structure; slightly acid.
100 to 112 inches, brown to dark-brown friable light silt loam; massive; calcareous.

The amount of mottling and gray coatings varies from few to many in different profiles. Gray coatings are more noticeable in dry seasons. The 100- to 112-inch layer is calcareous in some places and noncalcareous in others.

Use and management.—Nearly all of this soil has been cleared, and most of it is used for cotton, corn, hay, and pasture and for fruit and vegetables for home use. Yields are good if the soil is managed properly.

The management problems are control of erosion and proper fertilization. Such practices as cultivation along the contour and growing row crops in rotation with close-growing crops help prevent erosion. Fertilizer and lime requirements for each crop should be determined by soil tests. This soil is in capability unit 3.

Memphis silt loam, eroded gently sloping phase (5 to 8 percent slopes) (Mb).—This soil occurs in small, narrow areas in the western part of the Loess Hills. It differs from Memphis silt loam, eroded very gently sloping phase, mainly in slopes. Sheet erosion has removed from 2 to 5 inches of the original surface soil. The surface layer has been mixed in cultivation with part of the subsoil, and as a result it has a browner color than the original surface soil. Runoff is fairly rapid and the risk of erosion is high. A few small uneroded areas are included in this unit.

Use and management.—Most of this soil is still in hardwood forest. Some of the acreage is used for cotton, corn, hay, or pasture.

Erosion is one of the major management problems. Cultivation along the contour and rotation of row crops with close-growing crops for hay, pasture, or soil improvement helps to control it. The soil should be tested to determine the need for fertilizer and lime for various crops. It is in capability unit 11.

Memphis silt loam, eroded moderately steep phase (17+ percent slopes) (Me).—This soil occupies the steeper slopes on or near the western edge of the Loess Hills. Except for slopes, it is very similar to Memphis silt loam, eroded very gently sloping phase. Runoff is rapid, and the erosion hazard is very great because of the steep slopes. A few deep gullies not crossable with farm machinery have formed in some places. Included in this unit are a few well-protected areas that have not been noticeably eroded.

Use and management.—This soil is all in hardwood forest from which most of the merchantable trees have been cut. It is suited best for forestry or for wildlife refuges. It is in capability unit 28.

Memphis silt loam, eroded sloping phase (8 to 12 percent slopes) (Mc).—This soil occurs as widely scattered small areas in the western part of the Loess Hills. Its profile is similar to that of Memphis silt loam, eroded very gently sloping phase. It differs mainly in having stronger slopes. Sheet erosion has removed from 2 to 5 inches of the original surface layer. An occasional gully not crossable with farm machinery has formed in some of the areas. Runoff makes the hazard of erosion severe when the vegetation is removed from this soil.

Use and management.—Nearly all of this soil is in hardwood forest. Most of the merchantable trees have been cut. A few areas are in pasture.

This is a productive but erodible soil. It is suited best to forestry or to close-growing crops grown for small grain, hay, pasture, or soil improvement. Row crops can be grown in a long rotation with close-growing crops if the management is good. Gullies should be stabilized. The need of lime and fertilizer for various crops can be determined by soil tests. The soil is in capability unit 21.

Memphis silt loam, eroded strongly sloping phase (12 to 17 percent slopes) (Md).—This soil occurs in the western part of the Loess Hills. Its profile closely resembles that of Memphis silt loam, eroded very gently sloping phase, but its slopes are much stronger. Runoff is rapid, and the hazard of erosion is very great on unprotected soil. Nearly all of this soil has lost from 2 to 5 inches of soil material through sheet erosion. Included are a few areas on which erosion has been less.

Use and management.—All of this soil is in hardwood forest. Most of the merchantable trees have been removed. Because of the rapid runoff and severe hazard of erosion, this soil is suited best to forestry. Some of the less steep areas could be planted to perennial sod-forming

plants and used for pasture under controlled grazing. Gullies require stabilizing. This soil is in capability unit 27.

Memphis silty clay loam, severely eroded gently sloping phase (5 to 8 percent slopes) (Mg).—This soil occurs in relatively small areas in the western part of the Loess Hills. It differs from Memphis silt loam, eroded very gently sloping phase, in having darker brown and finer textured surface soil. Sheet erosion has removed nearly all of the original surface soil and, in places, part of the subsoil. A few deep gullies have formed in some of the areas.

Use and management.—All of this soil has been cleared and used for crops. Much of it is now idle and has grown up in broomsedge, briers, and bushes. Some fields are used mainly for cotton, hay, and pasture.

The control of erosion is a major problem in managing this soil. Cultivation along the contour and rotations that include close-growing crops for hay, pasture, soil improvement, or winter cover will help control the erosion. The fine texture of this soil makes it somewhat more difficult to till than the silt loam type. The amount of lime and fertilizers for various crops can be determined by soil tests. The soil is in capability unit 10.

Memphis silty clay loam, severely eroded moderately steep phase (17+ percent slopes) (Ml).—This soil has darker brown and finer textured surface soil than Memphis silt loam, eroded very gently sloping phase. Most of the original silt loam surface soil and, in places, part of the subsoil have been lost through erosion. An occasional deep gully has formed in some eroded areas. Runoff is very rapid; consequently, the hazard of erosion is great.

Use and management.—Most of this soil has been cleared and used for crops. Nearly all the cleared areas are now idle and have grown up in broomsedge, briers, and bushes. Cotton and corn are still being grown on some fields. This soil is suited best to trees or to kudzu as a supplemental source of forage. It is in capability unit 28.

Memphis silty clay loam, severely eroded sloping phase (8 to 12 percent slopes) (Mh).—This soil is in the western part of the Loess Hills. Compared with Memphis silt loam, eroded very gently sloping phase, it has a darker colored and finer textured surface soil and much stronger slopes. Nearly all of the original surface soil and, in places, part of the subsoil have been lost through erosion. An occasional deep gully, not crossable with farm machinery, has formed in some of the areas. The color of the surface soil ranges from yellowish browa to dark brown.

Use and management.—All of this soil has been cleared and used for crops, but much of it is now idle. Some of the acreage is used for cotton, hay, and pasture.

The control of erosion is a major problem on this soil. Row crops can be grown about 1 year in 4 in rotations with close-growing crops for hay, pasture, and soil improvement. All cultivation should be along the contour. The soil is suited best to perennial vegetation such as pasture or trees. Fertilizer and lime requirements for various crops can be determined by soil tests. Gullies need special stabilizing treatment. This soil is in capability unit 21.

Memphis silty clay loam, severely eroded strongly sloping phase (12 to 17 percent slopes) (Mk).—This soil is in fairly large areas in the western part of the Loess Hills. It has a finer textured, darker brown surface soil, and much stronger slopes than Memphis silt loam, eroded very gently sloping phase. Sheet erosion has removed most of the original surface layer and, in places, part of the subsoil. Runoff is rapid, and the erosion hazard is very great.

Use and management.—All of this soil has been cleared and used for crops. Much of it is now idle, but some of the acreage is used for cotton, hay, and pasture. Because of the strong slopes and excessive erosion, this soil needs a cover of trees or perennials for pasture or hay. Fertilizer and lime requirements for the various plants should be determined by soil tests. The gullies in this soil need to be stabilized. The soil is in capability unit 27.

Memphis silty clay loam, severely eroded very gently sloping phase (2 to 5 percent slopes) (Mf).—This soil is in long narrow areas in the western part of the Loess Hills. It differs from Memphis silt loam, eroded very sloping phase, mainly in having a finer textured and darker brown surface layer. The finer texture makes this soil more difficult to till and less permeable. Nearly all of the original surface layer and, in places, part of the subsoil have been lost through erosion.

Use and management.—All of this soil has been cleared and is used mainly for cotton, hay, and pasture. Some of the acreage is idle, and some is used for corn and for home gardens and orchards.

Erosion control, fertilization, and liming are the major management problems on this soil. Close-growing crops for hay, pasture, or soil improvement should be grown at least half the time in rotation with clean-cultivated crops. The quantities of lime and fertilizer needed for various crops can be determined by testing the soil. The soil is in capability unit 10.

Mhoon silty clay, nearly level phase (½ to 2 percent slopes) (Mm).—This soil occupies the recently formed natural levees of the Mississippi River. It occurs in the western part of the Mississippi River Alluvial Plain in association with the Robinsonville and Commerce soils. It differs from them mainly in having poorer drainage and a finer textured subsoil and in being in lower positions on the levees. Runoff and internal drainage are medium to slow.

The native vegetation consisted of a dense growth of hardwood trees and an undergrowth of brush, vines, and canes.

Profile description:

0 to 4 inches, dark grayish-brown friable silty clay; granular structure; neutral.
4 to 18 inches, dark grayish-brown firm silty clay mottled with dark yellowish brown; weak medium blocky structure; neutral to alkaline.
18 to 32 inches, dark-gray firm silty clay loam mottled with dark brown; indefinite structure; neutral to alkaline.
32 to 42 inches +, dark-gray firm to friable silty clay to silty clay loam mottled with dark brown; alkaline.

A few areas have a silty clay loam surface soil, and a few scattered areas have very gently sloping relief. The thickness and the arrangement of soil layers vary somewhat in places.

Use and management.—All of this soil that is protected by the levee has been cleared, and most of it is in cultivation. It is used for cotton, corn, oats, soybeans, rice, and pasture. The management requirements of this soil are adequate surface drainage, proper fertilization, and the use of rotations that will maintain organic matter and improve tilth. This soil is in capability unit 20.

Natchez silt loam, steep phase (17+ percent slopes) (Na).—This somewhat excessively drained soil occupies a relatively narrow band on the bluffs bordering the Misisssipi River Alluvial Plain. The parent material consisted of deep beds of loess. This soil has very little profile development. It occurs in association with the Memphis and the Loring soils. It differs from them primarily in being less developed, somewhat excessively drained, and alkaline or calcareous at an average depth of 36 to 48 inches.

The native vegetation consists mainly of oak, hickory, maple, and yellow-poplar.

Profile description:

- 0 to 3 inches, dark grayish-brown to brown very friable silt loam; weak fine granular structure; medium to slightly acid.
- 3 to 10 inches, yellowish-brown friable silt loam; weak medium blocky structure, readily broken into fine granules; medium to slightly acid.
- 10 to 30 inches, dark yellowish-brown to yellowish-brown friable light silt loam; coarse irregular blocky structure, readily broken into fine granules; slightly acid.
- 30 to 36 inches, brown to yellowish-brown friable silt loam, essentially structureless; slightly acid to neutral.
- 36 to 46 inches, yellowish-brown friable silt loam, essentially structureless; alkaline.
- 46 inches +, yellowish-brown very friable silt loam; calcareous.

Use and management.—All of this soil is in hardwood forest. Because of steep slopes and excessive erosion, this soil is best suited to forestry or wildlife refuges. It is in capability unit 28.

Olivier silt loam, eroded very gently sloping phase (2 to 5 percent slopes) (Ob).—This somewhat poorly drained soil developed from alluvium that washed from loess soils. It occupies terraces mainly along the flood plains of the larger streams, but a few small areas are along some of the smaller streams. This soil has a fragipan beginning at depths of 15 to 24 inches. It occurs in association with the Lintonia, Richland, and Calhoun soils. Compared with the Olivier soils, Lintonia soils are deeper and better drained and have no fragipan. Richland soils are better drained, less mottled, and deeper to the fragipan; Calhoun soils are more poorly drained.

The original vegetation consisted chiefly of oak, hickory, elm, sweetgum, blackgum, beech, ash, and maple.

Profile description:

- 0 to 4 inches, dark yellowish-brown friable silt loam; medium moderate blocky structure; strongly acid.
- 4 to 16 inches, yellowish-brown friable heavy silt loam; medium moderate blocky structure; many manganese concretions; strongly acid.
- 16 to 20 inches, light yellowish-brown firm to friable heavy silt loam; distinct and medium strong-brown mottles; moderate medium blocky structure; many manganese concretions; strongly acid.
- 20 to 48 inches, light-gray, firm, compact (fragipan) silt loam; numerous, prominent, coarse yellowish-brown mottles; many manganese concretions; strongly acid.

A few small areas varying from slightly eroded to severely eroded are included in this unit.

Use and management.—Most of this soil has been cleared and is used for cotton, corn, sorghum, hay, and pasture. Fair yields of most crops can be expected if management is good.

Cultivation along the contour and close-growing crops grown in rotation with clean-cultivated crops will help control erosion. Winter cover crops and summer legumes should be grown as green manure to maintain organic matter. Fertilizer and lime requirements for various crops should be determined by soil tests. This soil is in capability unit 14.

Olivier silt loam, nearly level phase (½ to 2 percent slopes) (Oa).—This soil is in the southwestern part of the Loess Hills adjoining the Coldwater River flood plain. It differs from Olivier silt loam, eroded very gently sloping phase, primarily in having a smoother, more level surface and less evident erosion. The surface soil is from 6 to 8 inches thick. Surface drainage is slow to moderate.

Use and management.—Nearly all of this soil has been cleared, and most of it is used for cotton, corn, soybeans, lespedeza, or pasture. Yields of most crops are fair if the soil is properly managed.

Management includes draining surface water, rotating crops, and applying fertilizer and lime. Row crops should be rotated with close-growing crops for hay, pasture, or soil improvement. Fertilizer and lime requirements for various crops should be determined by testing the soil. The soil is in capability unit 18.

Olivier silt loam, severely eroded gently sloping phase (5 to 8 percent slopes) (Oc).—This soil occurs as small areas widely scattered over the county. It differs from Olivier silt loam, eroded very gently sloping phase, mainly in having more erosion, stronger slopes, and a slightly finer textured surface soil. Nearly all of the original surface soil and, in places, part of the subsoil have been lost through sheet erosion. A few deep gullies that cannot be crossed by farm machinery have formed in some areas. Runoff is moderately rapid, and the hazard of erosion is high.

Use and management.—All of this soil has been cleared and cultivated. Much of it is now idle and has grown up in broomsedge, briers, and bushes. Some fields are still used for cotton, corn, hay, and pasture. Yields of most crops are only fair.

Cultivation along the contour and the growing of row crops in rotation with close-growing crops will help control erosion. Fertilizer and lime requirements for various crops should be determined by soil tests. The soil is in capability unit 23.

Richland silt loam, very gently sloping phase (2 to 5 percent slopes) (Ra).—This moderately well drained soil has developed from silty alluvium deposited when streams flowed at much higher elevations. It occupies terraces along the flood plains of larger streams in the Loess Hills. It is associated with other Richland soils and with soils of the Lintonia, Olivier, and Calhoun series. It differs from Lintonia soils mainly in being less well drained and in having a fragipan that retards the movement of water. It differs from the Olivier and Calhoun soils in having better drainage and a less mottled and darker subsoil. Richland silt loam, very gently sloping phase, has a moderate water-holding capacity. The native vegetation consisted mainly of red and white oaks, hickory, maple, sycamore, yellow-poplar, and elm.

Profile description:

- 0 to 6 inches, very dark grayish brown very friable silt loam; weak crumb structure; strongly acid.
- 6 to 12 inches, yellowish-brown, friable, heavy silt loam; medium weak blocky structure; strongly acid.
- 12 to 24 inches, yellowish-brown, moderately friable, heavy silt loam; weak medium blocky structure; a few small manganese concretions; strongly acid.
- 24 to 42 inches, light yellowish-brown, moderately firm (fragipan), compact silt loam; profuse very pale brown and dark-brown splotches; many manganese concretions; strongly acid.

The thickness of the surface layer ranges from 6 to 8 inches, depending on the damage from sheet erosion. Depths to the compact layer (fragipan) ranges from 24 to 36 inches. A few small level areas in the southwestern part of the county along the Coldwater River flood plain are included in this mapping unit.

Use and management.—Nearly all of this soil has been cleared. Most of it is used for cotton, corn, hay, and pasture. Yields are good if the soil is properly managed. Cultivation along the contour and rotations of close-growing crops with row crops will help control erosion. The quantities of fertilizers and lime needed for various crops can be determined by testing the soil. Richland silt loam, very gently sloping phase, is in capability unit 4.

Richland silt loam, eroded very gently sloping phase (2 to 5 percent slopes) (Rd).—This soil is very similar to Richland silt loam, very gently sloping phase, except that the surface soil has been reduced in thickness by sheet erosion and is 2 to 5 inches thick. This soil occurs along the flood plains of the larger streams in the Loess Hills. The largest areas are in the southwestern part of the Loess Hills bordering the flood plain of the Coldwater River. Included in this unit are a few small areas with slopes ranging from 5 to 8 percent.

Use and management.—Nearly all of this soil has been cleared, and most of it is used for cotton, corn, hay, or pasture. Good crops can normally be grown under good management. Contour cultivation, use of lime and fertilizer, and rotation of close-growing crops with row crops are good management practices. The soil is in capability unit 4.

Richland silt loam, severely eroded gently sloping phase (5 to 8 percent slopes) (Rb).—This soil usually occurs as long narrow areas adjacent to flood plains of streams. It differs from Richland silt loam, very gently sloping phase, mainly in slopes and erosion. Most of the original surface soil and, in places, part of the subsoil have been lost through sheet erosion. An occasional deep gully has formed in some areas. The surface soil is a yellowish-brown heavy silt loam. Runoff is rather rapid, and the erosion hazard is high.

Use and management.—All of this soil has been cleared and cultivated. Much of it is now idle and has grown up in broomsedge, briers, and bushes. Some of the acreage is used for cotton, corn, hay, and pasture. Yields are fair for most crops.

Row crops should not be grown very often on this soil, because of the erosion hazard. A long rotation of close-growing crops with row crops is desirable. Lime and fertilizer requirements for various crops can be determined from soil tests. This soil is in capability unit 13.

Richland silt loam, severely eroded sloping phase (8 to 12 percent slopes) (Re).—This soil usually occurs in long narrow escarpmentlike areas between the more level stream-terrace soils and the soils of the bottom lands. It has a slightly finer textured, browner surface soil, and stronger slopes than Richland silt loam, very gently sloping phase. Nearly all the original surface soil and, in places, part of the subsoil have been lost through sheet erosion. A few deep gullies have formed in some areas. Runoff is rapid, and the hazard of erosion is high.

Use and management.—Nearly all of this soil has been cleared and used for crops. Some acreage is now idle and has grown up in broomsedge, briers, and bushes. A few fields are used for cotton, corn, hay, or pasture. Yields of crops are only fair.

The control of erosion is the chief management problem. Close-growing perennials should be grown for hay, pasture, or soil improvement. Row crops should be grown only about 1 year in 4, and rows should be along the contour. Lime and fertilizer requirements for various crops can be determined by soil tests. This soil is in capability unit 22.

Richland silt loam, severely eroded very gently sloping phase (2 to 5 percent slopes) (Rc).—This soil occurs on flood plains of major streams in the Loess Hills. The most extensive areas border the flood plain of the Coldwater River. This soil is very similar to Richland silt loam, very gently sloping phase, except in degree of erosion. Most or all the original surface soil and, in places, part of the subsoil have been lost through sheet erosion. The surface soil is a yellowish-brown heavy silt loam. Surface runoff is moderate and the erosion hazard is high.

Use and management.—All of this soil has been cleared, and most of it is used for cotton, corn, hay, and pasture. Some of it is now idle. Contour cultivation and close-growing crops in rotation with row crops will help prevent erosion. Winter cover crops grow well on this soil. Lime and fertilizer requirements for the various crops can be determined by soil tests. This soil is in capability unit 13.

Robinsonville very fine sandy loam, nearly level phase (½ to 2 percent slopes) (Rf).—This well-drained soil is forming from recently deposited sandy sediments of the Mississippi River. It occurs in narrow bands paralleling the channel of the river on the recent natural levees or first bottoms. Nearly all of it is situated between the flood-control levee and the river and is subject to occasional overflow. This young soil shows no evidence of horizon development in the profile. It is easily penetrated by roots, water, and air; the water-holding capacity is good.

The native vegetation was a dense stand of hardwood trees and an undergrowth of vines, canes, and briers.

Profile description:

- 0 to 8 inches, brown very friable very fine sandy loam; neutral to alkaline.
- 8 to 24 inches, yellowish-brown very friable silt loam to very fine sandy loam; essentially structureless; neutral to alkaline.
- 24 to 32 inches, pale-brown, very friable, very fine sandy loam; structureless; neutral to alkaline.
- 32 to 42 inches +, very pale brown loose loamy fine sand; structureless; neutral to alkaline.

The soil varies from place to place in thickness and arrangement of the layers, but this profile is typical of the Robinsonville series in this county. Included with this soil are a few areas having slopes of 2 to 5 percent.

Use and management.—All of this soil has been cleared, and nearly all of it is now used for row crops, chiefly cotton. Some corn and truck crops are also grown. This is one of the most desirable soils for crops in the county.

This soil responds well to management. Moderate to heavy applications of nitrogen are commonly applied to all crops except legumes. Cover crops are usually not very successful because the soil may be flooded in winter. Crops are seldom damaged by floods in the growing season. Planting in spring is sometimes delayed. This soil is easily cultivated over a wide range of moisture conditions. Erosion is not a problem. This soil is in capability unit 1.

Sharkey clay, nearly level phase (½ to 2 percent slopes) (Sa).—This poorly drained soil was derived from fine textured sediments deposited by the Mississippi River in broad slackwater areas. The largest areas of this soil are in the southern part of the Mississippi River Alluvial Plain. Sharkey clay, nearly level phase, is closely associated with the Alligator soils and differs from them primarily in being darker throughout the profile and less acid. It is also associated with the Forestdale soils. It differs from these soils mainly in having finer textures in the lower part of the profile and in being less acid.

When this soil is plowed and allowed to weather, the clods fall apart into small aggregates. It is often referred to as buckshot land by local people. This soil develops large cracks when the subsurface becomes dry. Because of the low elevation, it is subject to local flooding during the wet winter season. This soil is high in content of plant nutrients, but because of its heavy texture and poor drainage, high yields of crops are not common.

The original vegetation consisted of a fairly dense stand of water oak, hickory, pecan, hackberry, sweetgum, and ash and an undergrowth of brush, vines, and briers.

Profile description:

0 to 4 inches, very dark gray very firm clay; moderate medium to fine granular; plastic and sticky when wet, hard when dry; slightly acid to neutral.

4 to 24 inches, dark-gray very firm plastic clay mottled with dark brown; massive or weak coarse blocky structure; slightly acid to neutral

24 to 42 inches +, dark-gray very firm clay mottled with dark brown and dark yellowish brown; massive or weak coarse blocky structure; slightly acid to neutral.

Several variations are noticeable in this mapping unit. A few scattered areas have silty clay or silty clay loam surface soil textures. An area about 4 miles north and another about 3 miles northeast of Lake Cormorant have somewhat better internal drainage because of the sandy-textured material in the lower part of the soil profile. A few long narrow areas that border some of the depressions have slopes slightly greater than 2 percent.

Use and management.—Most of this soil has been cleared, but some areas are still in forest. The soil is used mainly for cotton and soybeans. Excellent yields of rice have been produced in the past few years. Corn is not suited to this soil. Yields of soybeans are usually good, and those of cotton are fair. Most crops need only nitrogen for good yields.

Some good management practices are adequate surface drainage, proper crop selection, and cultivation when the moisture content is most suitable for tilling. A successful farmer must know how to manage this soil. The common practice for most crops is to break the soil or bed it in fall or winter, and plant seed in the spring without disturbing the soil very much. Winter cover crops are usually not grown. Erosion is not a hazard on this soil. This soil is in capability unit 20.

Sharkey clay, level phase (0 to ½ percent slopes) (Sb).—This dark-colored, fine-textured soil is in the southern part of the Mississippi River Alluvial Plain. It normally occurs in comparatively large areas in association with other phases of Sharkey soils and with the soils of the Alligator and Forestdale series. It differs from the nearly level phase of Sharkey clay mainly in slopes. Sharkey clay, level phase, is usually covered with floodwater for long periods during the winter. Adequate drainage of the surface is difficult because it is necessary to find an outlet that is lower than the areas to be drained.

Use and management.—Some areas of this soil are still in hardwood forest; others are used for cotton, soybeans, and rice. Yields of rice and soybeans are usually good, but those of cotton are only fair. Corn is not usually grown.

Winter cover crops are not grown, because of winter flooding. Soybeans are sometimes grown as a green manure crop. Surface drainage must be provided for all crops, but the expense is not always justified by the increases in yields. The soil can be cultivated within a narrow range of moisture content. It is in capability unit 16.

Sharkey very fine sandy loam, very gently sloping overwash phase (2 to 5 percent slopes) (Sc).—This soil usually occurs as long, narrow areas at the foot of sandy or silty slopes from which the coarse-textured soil material has washed or sloughed. This material covers part of the slack-water clay soils. The surface soil is grayish-brown very fine sandy loam that is 6 to 12 inches thick. This layer ends abruptly on a thick bed of clay.

Included with this soil are two areas on which the slopes are slightly less than 2 percent. One of these areas is just north of the beginning of the Mississippi River flood-control levee between the railroad and Highway 61; the other is one-fourth mile south of Eudora road (State Highway No. 3), just east of the Tunica County line.

Use and management.—All of this soil is cleared, and most of it is used for cotton, corn, and soybeans. Yields of these crops are fair if management is good. This soil is easily tilled within a fairly wide range of moisture content. Adequate surface drainage and fertilization are needed for best yields. Erosion is not a problem. This soil is in capability unit 7.

Vicksburg silt loam (0 to 2 percent slopes) (Va).—This well-drained soil is developing in recent silty alluvium that washed from loess soils. It is subject to deposition and removal of materials by floods. It occupies the first bottoms along the larger streams and smaller tributaries of the Loess Hills. It is closely associated with the soils of the Collins, Falaya, or Waverly series, but it is better drained than these soils. The water-holding capacity is very good, and the soil is moderately fertile. Plant roots, water, and air can easily penetrate the soil. Crops are seldom damaged by overflow, since floods usually occur during the winter.

The native vegetation was hardwoods that consisted mainly of oak, hickory, sweetgum, elm, and maple and an undergrowth of vines and canes.

Profile description:

0 to 8 inches, brown mellow silt loam; medium acid.

8 to 32 inches, yellowish-brown to light yellowish-brown very friable silt loam; essentially structureless; medium acid.

32 to 50 inches, brown friable silt loam; some splotches of pale brown in the lower part; some small dark-brown concretions; medium acid.

The splotches occur at various depths from place to place, and in some areas they may be absent. A few profiles have a dark-brown layer at a depth of about 36 inches.

Use and management.—Nearly all of this soil has been cleared, and most of it is used for cotton, corn, sorghum, soybeans, and pasture. This is one of the most productive and desirable soils for crops in the Loess Hills.

Excellent yields can be obtained if management is good. Winter cover crops are often grown as green manure.

This soil is easily tilled within a wide range of moisture content. Protection from flooding is sometimes needed. Lime and fertilizer requirements may be determined by soil tests. This soil is in capability unit 5.

Vicksburg and Collins silt loams, local alluvium phases (2 to 5 percent slopes) (Vb).—This mapping unit consists of undifferentiated well drained to moderately well drained soils. These soils have developed from local alluvium that washed from soils of loessal origin. This mapping unit is mainly in the western part of the Loess Hills and occupies long narrow areas adjacent to the drainageways. It also occupies upland depressions and toe slopes in intermediate positions between the uplands and the bottom lands. Many areas are Vicksburg soils; others are Collins soils.

The soils in this mapping unit have yellowish-brown surface layers and yellowish-brown to brown subsoils that may be slightly mottled at depths of 36 to 46 inches. Vicksburg and Collins soils are described elsewhere in this section of the report.

Included in this mapping unit are two areas that have slopes greater than 5 percent. One of these is at the edge of the Delta near the northwestern corner of Tunica County. The other is east of Camp Creek, 2½ miles southwest of the town of Olive Branch. In some places soils similar to the Vicksburg and to the Collins soils were included with this mapping unit.

Use and management.—Most of these soils have been cleared and are used for cotton, corn, sorghum, soybeans, and pasture. Yields are very good if management is good. Crops are seldom damaged in periods of high rainfall, but the soil should be protected from floods. The fertility and structure of the soils can be improved by growing green-manure crops. Commercial fertilizers should be applied according to results of soil tests. This soil is in capability unit 5.

Waverly silty clay loam (0 to 2 percent slopes) (Wa).—This poorly drained soil has formed from alluvium that washed from loessal soils. It occurs in small slack-water areas on the flood plains of Camp Creek and the Coldwater River. It is associated with soils of the Vicksburg, Collins, and Falaya series, but it is more poorly drained than these soils. In color and drainage characteristics, it somewhat resembles soils of the Calhoun series. Waverly silty clay loam is subject to periodic overflow, and it may be flooded much of the time in seasons of heavy rainfall. In the drier seasons of the year, this soil is dry because the moisture-holding capacity is very low. It is low in content of plant nutrients, and yields of most crops are poor.

The native vegetation consisted mainly of water oak, willow, tupelo-gum, maple, ash, elm, and sweetgum. The undergrowth was swampgrass, brush, and vines.

Profile description:

0 to 2 inches, dark grayish-brown friable silty clay loam; common, medium, faint mottles of gray and some large splotches of yellowish brown; strongly acid.

2 to 8 inches, gray firm silty clay profusely and distinctly mottled with medium to large areas of dark yellowish brown; strongly acid.

8 to 20 inches, gray to light-gray firm silty clay loam splotched with many large areas of yellowish red; strongly acid.

20 to 42 inches +, light-gray, firm, heavy silty clay loam splotched with a few medium to large areas of yellowish red; strongly acid.

The light-gray color is seen on the surface of some cultivated areas. The texture of the subsoil ranges from a silty clay loam to clay. Included in this unit are some areas near the junction of Camp Creek and the Coldwater River that have a silt loam surface soil.

Use and management.—Nearly all this soil is in hardwood forest because it is poorly drained and of low fertility. A small acreage has been used for hay or pasture, but most of this is now idle.

If adequately drained on the surface, this soil would be fairly well suited to fescue. However, establishing a good pasture of fescue would be expensive. At the present time, the best use of this soil is for hardwood trees. This soil is in capability unit 25.

Use and Management of Soils

In this section the soils of De Soto County are grouped into capability classes and units. The use and management of each capability unit are discussed. In addition, the average yields of principal crops that are expected from soils when they are used under ordinary and under improved levels of management are given.

Capability Groups of Soils

Soils of the county have been grouped in units within 6 capability classes. This is part of a nationwide system of capability grouping in which there are eight land-capability classes, up to four subclasses, and units that are groups of similar soils within each class and subclass.

The 8 general classes are based on the degree that natural features of each soil limit its use or cause risk of damage if it is used for crops, grazing, woodland, or wildlife. A soil is placed in one of the 8 classes after study of the uses that can be made of it, the risks of erosion or other damage when it is used, and the need for practices to keep it suitable for use, to control erosion, and to maintain yields.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation for annual or short-lived crops. Class I soils are those that have the widest range of use and the least risk of damage. They are level or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care. Class II soils can be cultivated regularly but do not have quite so wide a range of suitability as class I soils, or they need more protection. Some class II soils are gently sloping and, consequently, need moderate care to prevent erosion; others may be slightly droughty or slightly wet, or somewhat limited in depth. Class III soils can be cropped regularly but have a narrower range of use and need still more careful management.

In class IV are soils that should be cultivated only occasionally or only under very careful management. Most of them are good for other uses.

In classes V, VI, and VII are soils that as a rule should not be cultivated for annual or short-lived crops, but they can be used for pasture, range, woodland, or wildlife. Class V soils (none in this county) are nearly level to gently sloping, but they are droughty, wet, rocky, or otherwise unsuitable for cultivation. Class VI soils are

not suitable for crops because they are steep or droughty or otherwise limited, but they give fair or good yields of forage or forest products. Some soils in class VI can, without damage, be cultivated enough so that fruit trees or forest trees can be set out or pasture plants seeded. Class VII soils have more limitations than class VI and provide only poor to fair yields of forage or forest products.

In class VIII are soils that have practically no agricultural use. Some of them have value as watersheds, wildlife habitats, or scenery. Soils of class VIII do not occur in De Soto County. Soils not protected by the levee have not been mapped in detail and have not been classified as to capability.

The soils in any one capability class are limited by their natural features to about the same degree, but they may be limited for different reasons. To show the main kind of limiting factor, any one of classes II through VIII may be divided into from one to four subclasses, each identified by a letter following the capability class number. The letter "e" indicates that the risk of erosion is what chiefly limits the uses of the soil; the letter "w" is used if the soil is too wet for general use and needs water control; the letter "s" shows that the soil is shallow, droughty, or unusually low in fertility; and the letter "c" is used to indicate that the climate is so hazardous that it limits uses of the soil.

Capability classes and units

Capability classes and units in De Soto County are given in the following list. The symbols in parentheses are those used by the Soil Conservation Service in the county in 1957.

Class I.—Soils that have few limitations in use.
- Unit I (A8, I–1): Nearly level, moderately well or well drained loamy soils of the Mississippi River Alluvial Plain.

Class II.—Soils moderately limited for use as cropland.
- Unit 2 (A8, IIe–1): Gently sloping, moderately well or well drained silt loams or sandy loams of the Mississippi River Alluvial Plain.
- Unit 3 (A7, IIe–1): Very gently sloping, moderately well or well drained silt loams on uplands.
- Unit 4 (A7, IIe–5): Very gently sloping silt loams with pan layer in subsoil, on uplands or benches.
- Unit 5 (A7, IIw–1): Moderately well or well drained soils on flood plains of streams in the Loess Hills subject to overflow.
- Unit 6 (A8, IIs–4): Poorly drained silty clay loam of the old natural levees.
- Unit 7 (A8, IIs–5): Loamy overwash on poorly drained clay of Mississippi River Alluvial Plain.
- Unit 8 (A8, IIs–6): Moderately well drained silty clay loams of recent and old natural levees.

Class III.—Soils severely limited for cropland but suitable for a regular cropping system.
- Unit 9 (A8, IIIe–1): Gently sloping, well-drained loamy soil of the old natural levees.
- Unit 10 (A7, IIIe–1): Very gently or gently sloping, moderately well or well drained silty clay loams on uplands.
- Unit 11 (A7, IIIe–2): Gently sloping, moderately well or well drained silt loams on uplands.
- Unit 12 (A8, IIIe–3): Gently sloping, moderately well drained silty clay loams of old natural levees.
- Unit 13 (A7, IIIe–4): Severely eroded very gently or gently sloping silt loams with pan layer in subsoil, on uplands and benches.
- Unit 14 (A7, IIIe–5): Very gently sloping silt loam with pan layer in subsoil, on uplands or benches.
- Unit 15 (A7, IIIw–1): Somewhat poorly drained silt loams and silty clay loams on flood plains of streams in the Loess Hills.
- Unit 16 (A8, IIIw–11): Level poorly drained clay soil of the Mississippi River Alluvial Plain.
- Unit 17 (A8, IIIw–13): Poorly drained mixed soils in low places of the Mississippi River Alluvial Plain.
- Unit 18 (A7, IIIs–1): Nearly level silt loam with pan layer in subsoil, on benches.
- Unit 19 (A8, IIIs–1): Sandy and mixed soils on slopes along former river channels of the Mississippi River Alluvial Plain.
- Unit 20 (A8, IIIs–4): Nearly level, poorly drained clays and silty clays of the Mississippi River Alluvial Plain.

Class IV.—Soils fairly well suited for limited or occasional cultivation under careful management.
- Unit 21 (A7, IVe–2): Sloping, moderately well and well drained silt loams and silty clay loams on uplands.
- Unit 22 (A7, IVe–5): Severely eroded sloping silt loams with pan layer in subsoil, on uplands or benches.
- Unit 23 (A7, IVe–7): Severely eroded, gently sloping silt loams with pan layer in the subsoil, on uplands or benches.
- Unit 24 (A8, IVw–1): Poorly drained clay soil in low places of Mississippi River Alluvial Plain.
- Unit 25 (A7, IVw–2): Poorly drained silty clay loam on flood plains of streams in the Loess Hills.
- Unit 26 (A7, IVs–3): Nearly level or very gently sloping poorly drained silt loams on uplands or benches.

Class VI.—Soils not suitable for annual or short-lived crops and not more than moderately limited for use as pasture or woodland.
- Unit 27 (A7, VIe–2): Strongly sloping, moderately well or well drained silty clay on uplands.

Class VII.—Soils severely limited if used as grazing land or woodland.
- Unit 28 (A7, VIIe–1): Moderately steep and steep silty upland soils.
- Unit 29 (A7, VIIe–3): Gullied land.
- Unit 30 (A3, VIIe–4): Moderately steep deep sandy soils.

Unclassified soils.—Soils along the Mississippi River not protected by levee have not been classified as to capability.

Description of capability units

In this section each capability unit is described and the soils in it are listed. In addition, suggestions are given about how to use and manage the soils of each unit.

CAPABILITY UNIT 1 (A8, I-1)

Nearly level, moderately well or well drained loamy soils of the Mississippi River Alluvial Plain:

Bosket very fine sandy loam, nearly level phase.
Commerce very fine sandy loam, nearly level phase.
Dundee silt loam, nearly level phase.
Dundee very fine sandy loam, nearly level phase.
Robinsonville very fine sandy loam, nearly level phase.

Slopes on these soils range from ½ to 2 percent. Surface soils are very friable and easy to till. Inherent fertility and moisture-holding capacity are good. Commerce and Robinsonville soils are on recent natural levees, and the Bosket and Dundee are on old natural levees.

These soils are some of the most desirable in the county for crops, especially for cotton. They are excellent for most row crops, pasture, hay, forest, and wildlife. They are well suited to corn, grass and legume mixtures, and to winter grazing, but they are not well suited to rice. Rows should be on the contour. Crops other than legumes respond to nitrogen fertilizer. Lime may be needed for legumes and other crops on the Bosket and Dundee soils.

CAPABILITY UNIT 2 (A8, IIe–1)

Gently sloping, moderately well or well drained silt loams or sandy loams of the Mississippi River Alluvial Plain:

Bosket very fine sandy loam, very gently sloping phase.
Commerce silt loam, very gently sloping phase.
Dubbs silt loam, very gently sloping phase.
Dubbs very fine sandy loam, very gently sloping phase.
Dundee silt loam, very gently sloping phase.
Dundee very fine sandy loam, very gently sloping phase.

Slopes of these soils range from 2 to 5 percent. They have good water-holding capacity. Surface soils are friable and easy to till. Commerce soils are on recent natural levees; the other soils of this group are on old natural levees.

These soils are very good for row crops, hay, pasture, forest, and wildlife. They are well suited to all crops common in this area except rice. They are well suited to grass and legume mixtures and are very good for winter grazing. Tillage should be on the contour to help control erosion. Crops other than legumes respond to nitrogen fertilizer. Lime is likely to be needed for legumes and some other crops on the Bosket, Dubbs, and Dundee soils.

CAPABILITY UNIT 3 (A7, IIe–1)

Very gently sloping, moderately well or well drained silt loams on uplands:

Lintonia silt loam, eroded very gently sloping phase.
Loring silt loam, eroded very gently sloping phase.
Memphis silt loam, eroded very gently sloping phase.

Slopes of these soils of the Loess Hills range from 2 to 5 percent. Normally they occur in long narrow areas on the ridgetops. Surface soils are friable and easy to till, although sheet erosion has removed part of the original surface layer. Subsoils are fairly easily penetrated by water, roots, and air.

These soils are excellent for cotton, very good for corn, and well suited to small grain, soybeans, hay, and pasture. The soils respond well to heavy applications of nitrogen, phosphate, potash, and lime, but tests should be made to determine the amounts of these elements needed for various crops. Permanent pastures usually are seeded to dallisgrass or bermudagrass mixed with lespedeza or crimson clover.

Suitable crop rotations are:

1. Cotton for 2 years, followed by oats for 1 year and lespedeza for 2 years.
2. Lespedeza for 2 or 3 years, followed by row crops for 2 years.

CAPABILITY UNIT 4 (A7, IIe–5)

Very gently sloping silt loams with pan layer in subsoil, on uplands and benches:

Grenada silt loam, eroded very gently sloping phase.
Richland silt loam, eroded very gently sloping phase.
Richland silt loam, very gently sloping phase.

These soils on uplands and benches of the Loess Hills have slopes ranging from 2 to 5 percent. They are moderately well drained and have a fragipan at depths ranging from 20 to 36 inches that retards the movement of water. The water-holding capacity above the pan is somewhat limited. Sheet erosion has removed part of the original surface soil from some areas, but enough remains to form the present plow layer.

These soils are well suited to cotton, corn, small grain, hay, and pasture. Nitrogen, phosphate, potash, and lime are needed in large amounts, but the soils should be tested to determine the quantities required for each crop.

Permanent pastures that are seeded to mixtures of bermudagrass and lespedeza produce good forage. Crop rotations are necessary on these soils. Suitable rotations are the same as those described for land capability unit IIe–2.

CAPABILITY UNIT 5 (A7, IIw–1)

Moderately well or well drained soils on flood plains of streams in Loess Hills subject to overflow:

Collins loamy sand, overwash phase.
Collins silt loam.
Collins silty clay loam.
Collins silty clay loam, shallow phase.
Collins and Falaya silt loams, local alluvium phases.
Vicksburg silt loam.
Vicksburg and Collins silt loams, local alluvium phases.

The favorable texture of the surface soils and the nearly level relief make these soils easy to work. Floods on some areas delay spring planting and interfere with fieldwork during the growing season. Crops are occasionally damaged. On most areas of these soils, it is important to keep the main drainage channels sufficiently deep and clear to handle normal runoff. Because these soils have slow runoff and a high water table during part of the growing season, lateral ditches may be needed to remove excessive water. In some places ditches are needed to divert runoff that comes from adjacent higher lying areas.

The soils in this capability unit are suitable for intensive use. Row crops can be grown frequently if they are followed by winter cover crops. Corn, cotton, oats, lespedeza, and sorghum are the crops most commonly grown. Late summer pastures are especially well suited to these soils because they stay green and produce good forage and grazing during the dry part of the year. Dallisgrass mixed with whiteclover makes excellent pasture.

Lime is usually required, especially for legumes. Although these soils are relatively fertile, their favorable moisture relations make them responsive to heavy applications of nitrogen, phosphate, and potash. The quantities needed of these elements for each crop should be determined by testing the soil.

CAPABILITY UNIT 6 (A8, IIs–4)

Poorly drained silty clay loam of the old natural levees.

Forestdale silty clay loam, nearly level phase.

The medium to slow rate of runoff and the slow movement of water through this soil usually make drainage of

the surface necessary. The soil can be tilled only within a narrow range of moisture content because of the clay in the surface layer.

This soil is suited to soybeans, small grain, and most mixtures of grasses and legumes. It is fairly well suited to cotton and corn. Row crops should be followed by winter legumes. Crop rotations should include close-growing or sod-forming crops half the time to improve the soil. Irrigation water can be applied without serious losses from deep percolation.

Most crops need lime because the soil is strongly acid. All crops except legumes require heavy applications of nitrogen.

CAPABILITY UNIT 7 (A8, IIs-5)

Loamy overwash on poorly drained clay of the Mississippi River Alluvial Plain:

Sharkey very fine sandy loam, very gently sloping overwash phase.

Slopes of this soil range from 2 to 5 percent. The 6- to 12-inch surface layer is underlain by a thick bed of clay that retards the movement of water and makes surface drainage necessary. The soil is easily tilled within a fairly wide moisture range.

This soil is well suited to mixtures of grasses and legumes, and it is good for cotton and corn. Fescue and whiteclover grow well and furnish winter grazing.

Crops other than legumes need large quantities of nitrogen for highest yields; some crops may need lime. A suitable rotation consists of row crops for 1 year followed by close-growing or sod-forming crops for 2 years.

CAPABILITY UNIT 8 (A8, IIs-6)

Moderately well drained silty clay loams of recent and old natural levees:

Commerce silty clay loam, nearly level phase.
Dundee silty clay loam, nearly level phase.

Slopes of these soils range from ½ to 2 percent. The clay in the surface layers forms a crust that makes the soils somewhat difficult to till. The subsurface layers are usually finer textured than the surface layers.

These soils are excellent for pasture and hay and are very good for cotton, corn, small grain, and soybeans. Sericea lespedeza, alfalfa, and most mixtures of grasses and legumes grow well and can be grazed in winter.

Crops other than legumes respond to heavy applications of fertilizer. Lime may be needed by legumes on the Dundee soils.

CAPABILITY UNIT 9 (A8, IIIe-1)

Gently sloping, well-drained loamy soil of the old natural levees:

Dubbs very fine sandy loam, gently sloping phase.

The slopes of this soil range from 5 to 8 percent. Erosion is a hazard. Inherent fertility and the water-holding capacity are good. The surface soil is very friable, and it is easily tilled.

This soil is desirable for crops, and it responds well to good management. It is well suited to cotton, corn, and lespedeza and to most other crops commonly grown in the county except rice. It is excellent for grass, hay, and small grain. Forage crops grow well and provide good winter grazing. Lime may be needed for legumes and some of the other crops; nitrogen in large quantities is needed for crops other than legumes.

Row crops should be planted on the contour and should be followed by winter legumes. A suitable rotation for this soil consists of row crops the first year followed by close-growing or sod-forming crops for 2 years.

CAPABILITY UNIT 10 (A7, IIIe-1)

Very gently or gently sloping, moderately well or well drained silty clay loams on uplands:

Memphis silty clay loam, severely eroded gently sloping phase.
Memphis silty clay loam, severely eroded very gently sloping phase.
Loring silty clay loam, severely eroded gently sloping phase.
Loring silty clay loam, severely eroded very gently sloping phase.

Slopes of these severely eroded soils of the Loess Hills range from 2 to 8 percent. Erosion has removed nearly all of the surface soil and in places part of the subsoil. The moisture-holding capacity is good. Because of the clay content, these soils form a crust that slightly increases the difficulty of tillage.

These soils are suited to cotton, small grain, pasture, and hay. Pastures are seeded to bermudagrass and lespedeza. Nitrogen, phosphate, potash, and lime are needed for highest yields of most crops. The soils should be tested to determine the quantities of these elements needed for the various crops.

The control of erosion is the most important management problem. All cultivation should be along the contour, and the soils should be in close-growing crops most of the time. A suitable rotation consists of row crops for 1 year followed by close-growing crops for 2 years.

CAPABILITY UNIT 11 (A7, IIIe-2)

Gently sloping, moderately well or well drained silt loams on uplands:

Loring silt loam, gently sloping phase.
Memphis silt loam, eroded gently sloping phase.

Slopes of these soils of the Loess Hills range from 5 to 8 percent. The silt loam surface soils are friable and easy to till. Subsoils are silty clay loam. The water-holding capacity and the response to management are good. Although the risk of erosion is great, these soils are only slightly or moderately eroded.

The soils are well suited to cotton, small grain, pasture, and hay. Pastures are usually seeded to dallisgrass or bermudagrass mixed with lespedeza or whiteclover. Large amounts of nitrogen, phosphate, potash, and lime are needed to obtain best yields from these soils. The amounts required for each crop can be determined by soil tests.

The control of erosion is a major problem. All cultivation should be along the contour, and the soil should be under a cover of vegetation as long as possible. A suitable rotation consists of row crops 1 year followed by close-growing or sod-forming crops for 2 years.

CAPABILITY UNIT 12 (A8, IIIe-3)

Gently sloping, moderately well drained silty clay loams of old natural levees:

Dundee silty clay loam, gently sloping phase.
Dundee silty clay loam, very gently sloping phase.

Slopes of these soils range from 2 to 8 percent. Erosion is a hazard. Because of the fairly high clay content of the surface layers, these soils form a crust.

The soils of this unit are suited to most crops that are commonly grown in the county except rice. They are excellent for hay and very good for cotton and corn. Lespedeza, alfalfa, and most mixtures of grasses and legumes grow well and provide good winter grazing.

All cultivation should be along the contour. Most crops need lime for highest yields; crops other than legumes respond well to large quantities of nitrogen. A suitable rotation for these soils consists of 1 year of row crops followed by 2 years of close-growing or sod-forming crops.

CAPABILITY UNIT 13 (A7, IIIe-4)

Severely eroded very gently or gently sloping silt loams with pan layer in subsoil, on uplands and benches:

Grenada silt loam, severely eroded gently sloping phase.
Grenada silt loam, severely eroded very gently sloping phase.
Richland silt loam, severely eroded gently sloping phase.
Richland silt loam, severely eroded very gently sloping phase.

These soils are on uplands and benches of the Loess Hills. Slopes range from 2 to 8 percent. The soils are friable and are moderately well drained; the moisture-holding capacity is limited. A fragipan at depths ranging from 20 to 36 inches retards the movement of water.

The crops most commonly grown are cotton, oats, and lespedeza. Pastures are usually seeded with a mixture of bermudagrass and lespedeza. Nitrogen, phosphate, potash, and lime are needed for highest yields from these soils. The amounts needed for specific crops can be determined by soil tests.

Cultivation along the contour helps control erosion on these soils. A suitable rotation consists of row crops for 1 year and close-growing crops for 2 years.

CAPABILITY UNIT 14 (A7, IIIe-5)

Very gently sloping silt loam with pan layer in subsoil, on uplands and benches:

Calloway silt loam, eroded very gently sloping phase.
Calloway silt loam, very gently sloping phase.
Olivier silt loam, eroded very gently sloping phase.

Slopes of these soils of the Loess Hills range from 2 to 8 percent. The shallow subsoil limits the moisture-holding capacity and a fragipan at depths ranging from 12 to 24 inches retards the movement of water. The soils are friable, but drainage is somewhat poor.

These soils are best suited to hay or pasture. Lespedeza is well suited and is often grown in mixtures with bermudagrass for pasture. Summer legumes and winter cover crops are grown as green manure. Cotton and corn are fairly well suited to these soils.

The soils of this unit respond to applications of nitrogen, phosphate, and potash. The amounts needed for various crops can be determined by soil tests.

To help control erosion on these soils, row crops should be grown 1 year in 3 in rotations with close-growing crops. Rows should be on the contour.

CAPABILITY UNIT 15 (A7, IIIw-1)

Somewhat poorly drained silt loams and silty clay loams on flood plains of streams in the Loess Hills:

Falaya silt loam.
Falaya silty clay loam.
Falaya and Waverly silt loams, local alluvium phases.

These soils are nearly level, and they are somewhat poorly drained. They are very wet during periods of heavy rains and are often flooded in winter. Water is absorbed slowly by these soils, and the surface must be drained by lateral W- and V-type ditches. Outlets low enough to allow the drainage of these soils are hard to find in some areas.

The soils are suited best to corn, hay, and pasture; some cotton is grown. Winter cover crops are not grown because of the flooding. The soils respond to complete fertilizers and lime. Amounts needed for various crops should be determined by soil tests. A suitable rotation consists of 1 year of clean-tilled crops and 2 years of close-growing crops.

CAPABILITY UNIT 16 (A8, IIIw-11)

Level, poorly drained clay soil of the Mississippi River Alluvial Plain:

Sharkey clay, level phase.

Because of its clay content, this soil can be cultivated easily only within a narrow moisture range. The usual practice is to bed the soil in fall or winter and disturb it as little as possible in spring planting. Extensive drainage is required if the soil is to be used for row crops. Outlets lower than the area to be drained are difficult to find. Water stands on the soil for long periods in winter.

The soil is excellent for rice, good for soybeans, and poor for cotton and corn. It is well suited to pasture or forest. Mixtures of fescue and the whiteclovers or of dallisgrass and lespedeza are good for pastures. Most crops other than legumes need nitrogen for highest yields.

CAPABILITY UNIT 17 (A8, IIIw-13)

Poorly drained mixed soils in low places of the Mississippi River Alluvial Plain:

Dowling soils.

These fine-textured soils are in depressions. Water accumulates on them, and they must be drained adequately before crops can be grown. Suitable outlets for drainage systems are difficult to find in some areas. The clay allows the soils to be cultivated only within a narrow range of moisture.

If properly drained, the soils are suited to small grains, sorghum, silage crops, and temporary summer grazing. Fescue, dallisgrass, whiteclover, and lespedeza grow well on these soils, but cotton and corn are not suited.

These soils, because of their low position, are often used for the location of primary and secondary drainage ditches.

CAPABILITY UNIT 18 (A7, IIIs-1)

Nearly level silt loam with pan layer in subsoil, on benches:

Olivier silt loam, nearly level phase.

This soil on benches in the Loess Hills is somewhat poorly drained. It has a fragipan at depths ranging from 15 to 24 inches that retards the movement of water. The moisture-holding capacity is limited; consequently, the soil is droughty in the drier parts of the year. In seasons of heavy rain the soil becomes very wet.

The soil is suited best to hay and pasture, but some cotton and corn are grown. If properly managed, this soil produces fair to good yields. Crops need nitrogen, phosphate, potash, and lime. Quantities can be determined by soil tests. Row crops can be grown 1 year in 3 in rotation with close-growing crops for hay, pasture, or soil improvement.

CAPABILITY UNIT 19 (A8, IIIs-1)

Sandy and mixed soils on slopes along former river channels of the Mississippi River Alluvial Plain:

Beulah and Dundee soils, gently sloping phases.

These soils range in slope from 5 to 8 percent. They are somewhat excessively drained to moderately well drained, and medium to strongly acid. They tend to be somewhat droughty, especially the Beulah soils, and in dry years crops may be damaged through lack of moisture.

The soils are best suited to pasture and hay. They are well suited to small grains and to crops that allow winter grazing, and they are fairly well suited to cotton and early corn. Bermudagrass and crimson clover mixtures are good for pasture.

Some crops require lime; those other than legumes need large and fairly frequent applications of nitrogen. It is suggested that 1 year of row crops be rotated with 2 years of close-growing or sod-forming crops to help prevent erosion and increase fertility.

CAPABILITY UNIT 20 (A8, IIIs-4)

Nearly level, poorly drained clays and silty clays of the Mississippi River Alluvial Plain:

Alligator clay, nearly level phase.
Mhoon silty clay, nearly level phase.
Sharkey clay, nearly level phase.

These soils can be tilled only within a narrow moisture range because of their clay content. The usual practice is to bed the soils in fall or winter and disturb them as little as possible in spring planting. Excessive water has to be removed from these nearly level soils through shallow ditches.

The soils are well suited to rice, pasture, hay, small grains, lespedeza, and soybeans. They are poor for cotton and corn. Fescue, dallisgrass, lespedeza, johnsongrass, and red clover grow well on these soils but cannot be pastured in winter unless the sod is heavy. Rows should run so they drain off excess water to suitable outlets. Crops other than legumes respond to nitrogen fertilizer.

CAPABILITY UNIT 21 (A7, IVe-2)

Sloping, moderately well and well drained silt loams and silty clay loams on uplands:

Loring silt loam, sloping phase.
Loring silty clay loam, severely eroded sloping phase.
Memphis silt loam, eroded sloping phase.
Memphis silty clay loam, severely eroded sloping phase.

Slopes of these soils of the Loess Hills range from 8 to 12 percent. The moderately rapid surface runoff from these soils makes erosion a severe hazard.

These soils are suited best for perennial vegetation. They are not suited to prolonged use for row crops. Cotton and corn can be grown on the less steep slopes 1 year in 4 in rotations with close-growing crops. In addition, all cultivation should be along the contour and winter clover should follow the row crop. Vegetation should cover these soils most of the time to help control erosion.

Dallisgrass, bermudagrass, lespedeza, white and crimson clovers, and kudzu grow well on these soils and produce good forage. Most crops respond to complete fertilizers and lime. The amounts needed for each crop should be determined by soil tests.

The steeper slopes should be reforested; pine trees grow well and make an excellent cover.

CAPABILITY UNIT 22 (A7, IVe-5)

Severely eroded sloping silt loams with pan layer in subsoil, on uplands or benches:

Grenada silt loam, severely eroded sloping phase.
Grenada silt loam, sloping phase.
Richland silt loam, severely eroded sloping phase.

Slopes of these moderately well drained soils of the Loess Hills range from 8 to 12 percent. A fragipan at depths of 20 to 36 inches retards the movement of water through the soil. Runoff is rapid, and erosion is a serious hazard.

These soils should be in vegetation most of the time to control erosion. They are suited best to small grain, hay, and pasture. Bermudagrass and lespedeza are good pasture plants. Cotton is fairly well suited, but it should be grown only 1 year in 4 in rotations with close-growing crops.

Crops on these soils require nitrogen, phosphate, potash and lime. Quantities needed can be determined by soil tests.

CAPABILITY UNIT 23 (A7, IVe-7)

Severely eroded, gently sloping silt loams with pan layer in the subsoil, on uplands or benches:

Calloway silt loam, severely eroded gently sloping phase.
Olivier silt loam, severely eroded gently sloping phase.

Slopes of these poorly drained soils of the Loess Hills range from 5 to 8 percent. A fragipan at depths of 12 to 24 inches retards the movement of water.

Erosion is a hazard, and the soils should be kept in perennial vegetation as much of the time as possible. They are best suited to hay, pasture, or pine trees. Lespedeza and bermudagrass grow well and provide good forage. Row crops are not well suited to the soil, but they can be grown 1 year in 4 in rotations with close-growing crops.

These soils respond to nitrogen, phosphate, potash, and lime. Quantities needed can be determined by soil tests.

CAPABILITY UNIT 24 (A8, IVw-1)

Poorly drained clay soil in low places of the Mississippi River Alluvial Plain:

Dowling clay.

This soil is difficult to drain because water accumulates on it from higher soils. Drainage ditches can be successfully located on this soil to utilize the natural drainage pattern of the area. Because of the high clay content of this soil, tillage is difficult except within a narrow moisture range.

The soil is suitable for rice, soybeans, grain sorghum, and hay and silage crops. It affords temporary summer grazing. Cotton and corn are not suited to the soil.

CAPABILITY UNIT 25 (A7, IVw-2)

Poorly drained silty clay loam on flood plains of streams in the Loess Hills:

Waverly silty clay loam.

This soil is wet and often flooded in seasons of heavy rains. The water-holding capacity is low; consequently, the soil is droughty during the drier parts of the year.

If the surface is adequately drained, the soil can be used for corn, sorghum, lespedeza, and pasture. Row crops should be grown only 1 year in 4 in rotations with close-growing crops. Fescue grows well and makes good pasture. Crops grown on this soil respond to applications of nitrogen, phosphate, potash, and lime. Quantities needed by various crops can be determined by soil tests.

CAPABILITY UNIT 26 (A7, IVs-3)

Nearly level or very gently sloping poorly drained silt loams on uplands or benches:

Calhoun silt loam, nearly level phase.
Calhoun silt loam, very gently sloping phase.
Henry silt loam.

Surface soils and subsoils of these poorly drained soils of the Loess Hills are not easily penetrated by roots, water, and air. The soils are very wet during seasons of heavy rains. The moisture-holding capacity is very low; consequently, the soils are droughty during the drier parts of the year.

If the surface is drained adequately, hay, pasture, or soil-improving crops can be grown. Lespedeza is well suited; sorghum and corn yields are fair except in dry years. Row crops should be grown only 1 year in 4 in rotations with close-growing crops. Most crops need applications of nitrogen, phosphate, potash, and lime. The quantities needed can be determined by soil tests.

CAPABILITY UNIT 27 (A7, VIe-2)

Strongly sloping, moderately well or well drained silty clay on uplands:

Brandon-Loring silt loams, strongly sloping phases.
Loring silt loam, eroded strongly sloping phase.
Loring silt loam, strongly sloping phase.
Loring silty clay loam, severely eroded strongly sloping phase.
Memphis silt loam, eroded strongly sloping phase.
Memphis silty clay loam, severely eroded strongly sloping phase.

Slopes of these soils of the Loess Hills range from 12 to 17 percent. The rapid runoff has damaged these soils. In places all the original surface soil and part of the subsoil have been lost through erosion. Gullies that cannot be crossed by farm machinery have formed in some places. The erosion hazard is very high.

The soils of this unit are best suited to permanent pasture or forest. They are not suitable for row crops. Dallisgrass, bermudagrass, lespedeza, crimson clover, and kudzu grow well and provide good forage. Pastures are easier to establish on soils with a silt loam surface texture than on soils with a silty clay loam surface texture. Crops on these soils respond to liberal applications of nitrogen, phosphate, potash, and lime. Quantities should be determined by soil tests.

Areas to be reforested should be planted to pines. Areas now in hardwoods should be improved and given good forest management that includes protection from fire and grazing, culling, selection of the best species of trees, and marketing mature trees.

CAPABILITY UNIT 28 (A7, VIIe-1)

Moderately steep and steep silty uplands soils:

Lexington-Loring-Providence silt loams, eroded moderately steep phases.
Loring silt loam, moderately steep phase.
Memphis silt loam, eroded moderately steep phase.
Memphis silty clay loam, severely eroded moderately steep phase.
Natchez silt loam, steep phase.

The predominant slopes of these soils of the Loess Hills exceed 17 percent. The soils are moderately well to somewhat excessively drained. They are suited best to forestry, recreation, and wildlife refuges. Pines should be planted where hardwoods are not established. Areas of these soils should be protected from fire and grazing and given good forest management.

CAPABILITY UNIT 29 (A7, VIIe-3)

Gullied land:

Gullied land, Grenada soil material.
Gullied land, Loring soil material.

Most areas of these land types are dissected by an intricate pattern of deep gullies that make cultivation difficult or impossible. Many of these gullies have cut through the loess and extend into the underlying Coastal Plain material. These land types are suited best to trees and should be planted to pines. Kudzu can be established for temporary grazing. Permanent pastures can be developed in some places if the gullies are filled and the smoothed areas are fertilized and seeded to legumes and grasses.

CAPABILITY UNIT 30 (VIIe-4)

Moderately steep deep sandy soils:

Guin gravelly sandy loam, moderately steep phase.
Kershaw sand, moderately steep phase.

The slopes of these excessively drained soils range from 17 to 40 percent. The inherent fertility is low, and the soils are suited best for forestry, recreation, or wildlife refuges. Inferior trees are produced on these soils.

Estimated yields

The estimated average yields that can be expected from the principal crops grown on soils of De Soto County under two levels of management are given in table 5. The estimates shown are based mainly on information gathered through interviews with farmers, county agricultural workers, and others who have observed yields. The yields are as accurate as can be given without detailed and lengthy search of production records; however, they give the relative productivity of soils shown on the soils map.

Yields in columns A were obtained under common or ordinary management. Under such management the soils may be inadequately fertilized or drained, or unsuitable crop rotations are used. In other instances seedbed preparation is poor, crop varieties are not the best, or insect control is inadequate. Yields are less than those obtained under improved management.

Yields in columns B were obtained under improved or good management. Under this level of management, the soils are adequately drained and fertilized. Crop rotations are suitable for the soil, and they maintain or improve supplies of organic matter. Seedbed preparation is good, crop varieties are the best available, and insect pests are adequately controlled. All good cultural practices recommended for soils in the county are applied.

TABLE 5.—*Estimated average acre yields of principal crops*

[Yields in columns A are those to be expected over a period of years under common management practices; those in columns B, under good management practices. Absence of yield indicates crop is seldom, if ever, grown]

Soil	Cotton lint		Corn		Soybeans		Oats		Permanent pasture	
	A	B	A	B	A	B	A	B	A	B
	Lb.	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Acres per animal unit* [1]	*Acres per animal unit* [1]
Alligator clay, nearly level phase	300	375	20	30	20	25	20	40	6.0	4.0
Alluvial soils	------	350	------	45	------	20	------	50	6.5	3.0
Beulah and Dundee soils, gently sloping phases	250	400	22	50	15	20	40	60	5.0	2.3
Bosket very fine sandy loam:										
Very gently sloping phase	650	750	45	75	25	30	45	70	4.2	1.8
Nearly level phase	675	800	55	90	25	32	50	75	4.0	1.6
Brandon-Loring silt loams, strongly sloping phases	------	------	------	------	------	------	------	------	------	------
Calhoun silt loam:										
Nearly level phase	------	------	------	------	------	------	18	30	7.0	4.0
Very gently sloping phase	------	------	------	------	------	------	15	28	7.0	4.0
Calloway silt loam:										
Eroded very gently sloping phase	225	300	18	30	12	18	20	32	6.0	4.0
Severely eroded gently sloping phase	150	200	10	25	6	10	12	22	7.8	4.6
Very gently sloping phase	250	325	20	35	15	20	20	35	6.0	3.8
Collins silt loam	475	625	40	65	15	22	30	50	3.8	2.0
Collins silty clay loam	435	600	35	60	15	22	30	50	4.0	2.2
Shallow phase	400	575	35	60	15	22	30	50	4.0	2.2
Collins loamy sand, overwash phase	300	400	30	55	------	------	15	25	5.0	2.5
Collins and Falaya silt loams, local alluvium phases	300	425	40	60	20	25	25	40	4.0	2.0
Commerce very fine sandy loam, nearly level phase	600	775	55	85	25	30	45	70	3.2	1.7
Commerce silt loam, very gently sloping phase	550	750	55	85	25	30	45	70	3.2	1.7
Commerce silty clay loam, nearly level phase	500	700	50	80	20	25	40	65	3.6	1.9
Dowling clay	175	250	10	25	10	15	25	45	------	------
Dowling soils	200	300	15	30	15	20	------	------	6.0	3.3
Dubbs very fine sandy loam:										
Very gently sloping phase	650	800	55	90	28	35	40	60	4.2	2.3
Gently sloping phase	600	750	50	80	28	35	40	60	4.8	2.5
Dubbs silt loam, very gently sloping phase	625	775	50	80	28	35	40	60	4.2	2.3
Dundee silty clay loam:										
Nearly level phase	450	550	45	65	25	30	25	45	4.5	2.4
Gently sloping phase	400	500	30	60	22	28	26	38	5.2	2.9
Very gently sloping phase	450	550	35	65	25	32	25	40	4.8	2.6
Dundee silt loam:										
Nearly level phase	500	650	45	65	28	35	25	55	4.0	2.2
Very gently sloping phase	450	600	30	60	28	35	35	60	4.2	2.3
Dundee very fine sandy loam:										
Nearly level phase	625	725	45	70	28	35	45	65	4.6	2.4
Very gently sloping phase	550	700	45	65	28	35	40	60	4.8	2.5
Falaya silt loam	250	300	20	45	14	18	20	30	5.5	3.2
Falaya silty clay loam	250	300	18	40	14	18	20	30	5.5	3.2
Falaya and Waverly silt loams, local alluvium phases	------	------	------	------	8	14	------	------	5.8	3.6
Forestdale silty clay loam, nearly level phase	325	450	25	45	20	25	30	45	4.8	2.6
Grenada silt loam:										
Eroded very gently sloping phase	300	400	22	40	15	20	30	50	5.2	2.8
Severely eroded gently sloping phase	200	250	12	20	12	16	20	35	6.4	3.2
Severely eroded sloping phase	------	------	------	------	------	------	------	------	7.4	3.8
Severely eroded very gently sloping phase	225	275	18	25	14	18	25	40	5.2	2.7
Sloping phase	250	325	15	35	15	20	------	------	5.2	3.0
Guin gravelly sandy loam, moderately steep phase	------	------	------	------	------	------	------	------	------	------
Gullied land, Grenada soil material	------	------	------	------	------	------	------	------	8.0	5.0
Gullied land, Loring soil material	------	------	------	------	------	------	------	------	7.0	4.8
Henry silt loam	------	------	------	------	------	------	------	------	8.0	4.5
Kershaw sand, moderately steep phase	------	------	------	------	------	------	------	------	------	------
Lexington-Loring-Providence silt loams, eroded moderately steep phases	------	------	------	------	------	------	------	------	------	------
Lintonia silt loam, eroded very gently sloping phase	425	500	35	60	20	25	45	70	4.0	2.0
Loring silt loam:										
Eroded very gently sloping phase	425	550	30	50	20	22	35	55	4.4	2.4
Eroded strongly sloping phase	------	------	------	------	------	------	------	------	5.5	3.8
Gently sloping phase	350	400	25	45	15	20	30	50	4.8	2.4
Moderately steep phase	------	------	------	------	------	------	------	------	------	------
Sloping phase	300	350	20	35	12	18	------	------	5.0	2.2
Strongly sloping phase	------	------	------	------	------	------	------	------	5.0	3.5

See footnote at end of table.

TABLE 5.—*Estimated average acre yields of principal crops*—Continued

Soil	Cotton lint		Corn		Soybeans		Oats		Permanent pasture	
	A	B	A	B	A	B	A	B	A	B
	Lb.	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Acres per animal unit* [1]	*Acres per animal unit* [1]
Loring silty clay loam:										
Severely eroded gently sloping phase	250	300	15	25	8	12	25	45	5. 8	2. 8
Severely eroded sloping phase	150	200	10	18	8	12	25	45	6. 0	3. 0
Severely eroded strongly sloping phase									6. 5	4. 2
Severely eroded very gently sloping phase	300	375	20	35	12	18	20	40	5. 2	3. 0
Memphis silt loam:										
Eroded very gently sloping phase	500	650	45	65	20	25	40	65	4. 0	1. 8
Eroded gently sloping phase	320	400	25	40	15	20	35	60	5. 0	2. 4
Eroded moderately steep phase										
Eroded sloping phase	300	375	20	30	15	20	30	55	5. 0	2. 5
Eroded strongly sloping phase									5. 5	2. 7
Memphis silty clay loam:										
Severely eroded gently sloping phase	275	300	15	25	10	15	25	45	5. 5	2. 7
Severely eroded moderately steep phase										
Severely eroded sloping phase	175	250	10	20	8	12	20	35	5. 8	3. 2
Severely eroded strongly sloping phase									6. 8	3. 8
Severely eroded very gently sloping phase	325	400	25	40	15	20	35	60	5. 6	2. 3
Mhoon silty clay, nearly level phase	300	400	25	65	25	30	40	65	4. 8	2. 8
Natchez silt loam, steep phase										
Olivier silt loam:										
Eroded very gently sloping phase	275	375	30	50	15	22	25	50	6. 0	3. 2
Nearly level phase	275	375	35	60	15	22	25	50	6. 0	3. 2
Severely eroded gently sloping phase	175	250	12	20	8	12	15	30	6. 8	3. 6
Richland silt loam:										
Very gently sloping phase	400	500	32	50	20	25	35	60	4. 2	2. 2
Eroded very gently sloping phase	350	475	28	45	15	22	30	55	4. 5	2. 4
Severely eroded gently sloping phase	200	250	18	25	10	12	20	35	5. 5	3. 4
Severely eroded sloping phase	175	225	14	22	8	10	18	30	6. 0	4. 0
Severely eroded very gently sloping phase	250	300	20	30	12	15	20	40	4. 8	3. 0
Robinsonville very fine sandy loam, nearly level phase	700	825	50	90	28	35	55	75	3. 2	1. 5
Sharkey clay:										
Nearly level phase	300	425	18	35	20	25	20	40	6. 4	4. 1
Level phase	275	375	15	35	20	25	20	35	6. 5	4. 2
Sharkey very fine sandy loam, very gently sloping overwash phase	375	500	20	45	20	25	20	40	4. 8	2. 5
Vicksburg silt loam	500	725	50	90	22	28	45	75	4. 0	1. 6
Vicksburg and Collins silt loams, local alluvium phases	525	700	50	90,	24	30	40	65	3. 8	1. 5
Waverly silty clay loam			10	20					6. 5	3. 5

[1] Average number of acres needed to furnish adequate grazing, without injury to the pasture, for 1 animal unit for a grazing season of 215 days. An animal unit is equivalent to 1 cow, steer, or horse, 5 hogs, or 7 sheep or goats.

Genesis, Morphology, and Classification of Soils

Soil is the product of the forces of weathering and soil development acting on the parent material that has been deposited or has accumulated through geologic agencies. The characteristics of the soil at any given point are determined by (1) the physical and mineralogical composition of the parent material, (2) the climate under which the soil material has accumulated and has existed since accumulation, (3) the plant and animal life in and on the soil, (4) the relief, or lay of the land, and (5) the length of time the forces of development have acted on the material. The effects of climate on soil development depend not only on such factors as temperature, rainfall, and humidity, but also on the physical characteristics of the soil or soil material and on the relief, which in turn strongly influences drainage, aeration, runoff, erosion, and exposure to sun and wind.

Climate and vegetation are active forces of soil genesis. They act on parent material accumulated through the weathering of rocks and slowly change it into a natural body with genetically related horizons. The effects of climate and vegetation are conditioned by relief. The nature of the parent material also affects the kind of profile that can be formed and in extreme cases may dominate it. Finally, time is needed for the changing of the parent material into a soil profile. The time needed for horizon differentiation may be much or little, but some time is always required. Usually a long time is required for the development of distinct horizons.

Factors of Soil Formation

The factors of soil genesis are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one unless conditions are specified for the other four. Many of the processes of soil development are unknown.

Parent material

The parent materials of the soils of De Soto County consist of unconsolidated beds of fine to coarse particles deposited by wind or water; they can be classified as (1) loess, (2) Coastal Plain deposits, and (3) alluvium.

The soils in the Loess Hills cover about 85 percent of the county. They have developed either wholly or in part from weathered loess, which originally probably covered the entire upland region. Geologic erosion removed most of the material from strong slopes. The thickness of loess material ranges from a few inches on some of the steeper slopes to many feet on some nearly level places. The layer of loess is thickest in the western part of the county near the edge of the Loess Hills. The overlapping of the loess deposits on Coastal Plain deposits results in the formation of polygenetic soil profiles in many parts of the county. Where the cover of loess is shallow, the upper horizons of the soils have developed from weathered loess, and the lower horizons from Coastal Plain sandy or gravelly material.

Most authorities believe the loess is of glacial origin and that it was deposited in flood plains and later redeposited on the older Coastal Plain formation to various depths (*10*).[1] The loess originally was calcareous silt and formed a fairly level plain. Weathering and erosion have made this plain into a highly dissected area of acid soils. The relief ranges from level to hilly.

The deepest loess is in the more rugged area paralleling the bluff along the Mississippi River Alluvial Plain. In places in this area, some of the original calcareous loess occurs at various depths in the unweathered part of the profile. Unweathered loess is noted for the uniformity of its physical and chemical composition. Other distinctive characteristics are the fine texture and irregular shape of its particles, its lack of coherence, and its ability to absorb water, to stand in vertical walls, and to resist weathering (*10*).

A few soils in the Loess Hills have been formed entirely of Coastal Plain materials; other soils have been formed largely of these materials but are capped by a thin layer of loess. The texture of the Coastal Plain materials ranges from gravelly sandy clay to loamy sand. The relief of these areas is rolling to hilly, and the native vegetation consists mainly of oak and hickory.

Many soils have been formed from general alluvium deposited by the Mississippi River, but some of the alluvium has been deposited locally by tributaries. The soils derived from alluvium cover about 15 percent of the county area.

The inherent fertility and the type of parent material of soils in the Mississippi River Alluvial Plain vary widely. The river transported sediments containing a variety of minerals from many areas north of De Soto County. These sediments ranged in texture from fine gravel to clay, and they were deposited in stratified layers and mixed in various combinations. The relief varies from depressed areas to slopes of more than 10 percent. Many types of alluvium occur within this relatively wide range in gradient. The soils in this alluvium vary considerably in development, but they are all considered to be young. Some of the soils frequently receive new deposits, whereas others have received no appreciable deposits since levees were constructed prior to 1859 (*3*).

[1] Italic numbers in parentheses refer to Literature Cited, p. 62.

Climate

The climate of De Soto County is of the humid, warm, continental type characterized by rather warm summers and mild winters. The average temperatures and rainfall distribution are given in table 1.

The warm and moist weather that prevails most of the year favors rapid chemical reactions. The relatively high precipitation leaches the soluble materials, such as bases, and promotes the translocation of less soluble materials, such as collodial matter. Climate is the direct or indirect cause of variations in plant and animal life and of the major differences they have brought about in the development of soils. In the warm humid climate of the county, the mature soils have been highly leached, and the geologically young soils are being leached.

Plant and animal life

The higher plants, micro-organisms, earthworms, and other forms of life that live on or in the soil are determined by climate and many other factors. Living organisms affect soil development.

The organic matter that accumulates in the upper part of the soil from the decay of leaves and other parts of plants is changed into other chemical compounds by living organisms. The organic acids released by decomposition of organic matter dissolve the slowly soluble mineral constituents and speed the leaching and translocation of inorganic materials. Climate, however, affects the kinds and amounts of vegetation and micro-organisms and the rates of chemical action and of leaching.

Native vegetation of the Mississippi River Alluvial Plain ranges from thick stands of large deciduous trees and a heavy undergrowth of vines and cane to fresh-water swamp vegetation consisting mainly of cypress and tupelo-gum with very little undergrowth. In some of the soils, aerobic conditions are practically ideal for vigorous biological activity that rapidly reduces organic matter. In other soils, however, anaerobic conditions predominate and organic matter decomposes very slowly.

The native vegetation on the uplands and terraces of the Loess Hills was hardwoods of the oak-hickory type. The flood plains contained a cover primarily of oak, gum, and beech and a fairly heavy undergrowth of vines and cane. Organic matter is rapidly reduced by aerobic biological activity in most of the soils of the Loess Hills.

The forest cover and the warm humid climate have greatly contributed to the light color and low content of organic matter in the soils. In virgin areas the surface ½ to 1 inch of the more mature soils is generally dark and contains a considerable quantity of partly decayed leaves, twigs, and bark. Elsewhere, however, the environmental conditions do not allow the accumulation of large quantities of organic matter. An exception is the Sharkey series in which the soils contain an appreciable quantity of organic matter and may be considered dark colored.

Relief

The relief of the soils modifies the effects of climate and vegetation. The soils of De Soto County range from level or nearly level to moderately steep and steep. On some steep slopes, runoff is so great that geologic erosion keeps almost even pace with soil formation. Soil materials do not remain in place long enough to allow formation of a profile having genetically related horizons. On these

steep slopes, the quantity of water that percolates through the soil is small, and the amount of material leached and washed downward is also small.

Time

Time is necessary for the development of soils from the parent material. The length of time required for the formation of a soil depends on the other factors involved. If the factors of soil formation have not operated long enough to form a soil that is nearly in equilibrium with the environment, the soil is considered young, or immature.

Soils in the county range from young to mature or old. Those of the bottom lands and of local alluvium are young and are forming primarily from silty sediments that washed from soils derived from loess materials. Their profiles are undeveloped because soil-forming processes have not acted on them long enough to form noticeable horizons of eluviation and illuviation.

The oldest and best developed soils derived from loess materials are on uplands. Next in age are soils on the old stream terraces, which were formed from loess sediments deposited when the streams were at much higher elevations than the present flood plains. The soils of the terraces are not so well developed as those of the uplands. However, they have developed characteristic properties and are essentially in equilibrium with their environment. In these soils the number of horizons is influenced by relief and drainage. On the steeper slopes, where geologic erosion is too rapid for the formation of regional, or zonal, profiles, soils have a thinner solum and are otherwise less well developed than soils on the gentler slopes.

Processes of Soil Formation

Soil-forming processes are complex because of the wide range in parent material, relief, age, and biologic activity. Because of the climate and vegetation, podzolization is the primary soil-forming process except where parent material and relief are extreme enough to suppress or overbalance the other factors. In many instances, however, relief and parent material do limit, or suppress entirely, the progress of podzolization, and gleization becomes active in varying degrees. All of the soils of the Mississippi River Alluvial Plain are immature and the effects of soil-forming processes are not strongly expressed in the profiles. In the Loess Belt the soil-forming processes have gone much further and some mature soils have been formed.

In this county podzolization is the dominant soil-forming process where the soils are well enough drained and the textures are not too fine. The intensity of the process varies.

Gleization is the dominant soil-forming process in the development of soils from fine-textured materials that are impervious, or nearly so, and occur on the more level areas. The lack of percolating water in these soils results in reduced leaching, pronounced hydration, anaerobic biological activity, accumulation of organic acids, reduction of iron, and development of gray colors. Gray, yellow, and brown mottling occurs under moisture conditions that range from wet through moist to dry. Low-Humic Gley soils develop where water stands continuously close to or above the surface.

No definitive technical term for the process involved in the formation of Grumusols is available. The process is sometimes called self-swallowing. The soil swells, shrinks, and cracks, and materials from the upper profile horizons drop through cracks into lower horizons (*6*).

Some soils intermediate in texture and drainage are subject to the combined processes of podzolization and gleization in varying degrees of intensity, depending on the character of parent material, relief, and biologic agents. An example of this is the fragipan in the soils of the Planosol group. Although most of these soils were developed under podzolization, some were influenced by gleization.

De Soto County lies in what is generally considered the broad general Red and Yellow Podzolic soil region of Eastern United States (*2*). None of the soils of the county, however, are classified as Red–Yellow Podzolic soils. Some of the soils influenced by Coastal Plain material have some characteristics of the Red-Yellow soils. Thus they are grading toward the soils of the Red and Yellow region. The soil-forming processes show evidence of gleiziation in some soils and podzolization in others.

The soils of the Mississippi River Alluvial Plain have clay to loamy sand surface soil textures and surface soil colors that range from very dark grayish brown to brown and very dark gray. In slack-water areas the surface soil textures are predominantly clay and silty clay and the surface soil color is usually dark gray and dark grayish brown. The surface soil textures of the natural levees are primarily very fine sandy loam, silt loam, and silty clay loam. Surface soil colors range from grayish brown to brown.

The predominant surface textures of the soils of the Loess Hills are mainly silt loam and silty clay loam, and surface colors range from very dark grayish brown, to brown, yellowish brown, and gray. The original surface texture of all the soils formed from loess in the uplands and terraces was silt loam, and the predominant surface color was grayish brown to brown. Accelerated erosion has removed the silt loam in many places and has exposed the finer textured strong-brown to yellowish-brown or light brownish-gray to pale-brown subsurface layers. The surface textures of the soils of the alluvial and local alluvial areas range from silt loam to silty clay loam, and the surface colors range from dark grayish brown to brown.

In the Mississippi River Alluvial Plain, the soils of the Beulah, Bosket, Dubbs, and Dundee show more profile development than any of the other soils of the area. The tendency toward profile development in these soils has probably been due to their higher topographic position, coarser texture, good or moderately good drainage, and longer exposure to weathering processes. Lack of adequate drainage and recentness of the alluvial parent materials have prevented all but minor profile development in other soils of this alluvial plain.

The soil-forming processes have been working much longer on the soils of uplands and most of the stream terraces of the Loess Hills than on those of the Mississippi River Alluvial Plain. Many of the upland and terrace soils, therefore, show well-developed soil profile characteristics. The soils of the bottoms and local alluvial areas show little or no profile development.

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Classification of Soils by Higher Categories

Soils are placed into narrow classes for the organization and application of knowledge about their behavior within farms or counties. They are placed in broad classes for study and comparison of large areas such as continents. In the comprehensive system of soil classification followed in the United States (*8*), the soils are placed in six categories, one above the other. Beginning at the top, the six categories are the order, suborder, great soil group, family, series, and type (*7*).

The highest category has the soils of the whole country grouped into three orders, whereas thousands of soil types are recognized in the lowest category. The suborder and family categories have never been fully developed and thus have been little used. Attention has largely been given to the classification of soils into soil types and series within counties or comparable areas and to the subsequent grouping of series into great soil groups and orders. The soil orders and great soil groups are discussed in this section. The soil series, types, and phases are discussed in the section Soil Survey Methods and Definitions.

The soil series are classified by orders and great soil groups in table 6, and some of the factors that have contributed to their morphology are given.

Zonal soils

Zonal soils have well-developed characteristics that reflect the influence of the active factors of soil genesis—

TABLE 6.—*Soil series classified according to order and great soil group, and the major factors that have contributed to differences in soil morphology*

Great soil group and series	Parent material	Relief	Degree of profile development	Contrast between horizons
ZONAL				
Gray-Brown Podzolic:				
Memphis	Deep loess	Very gently sloping to moderately steep.	Strong	Medium.
Lintonia	Old alluvium from loess	Very gently sloping	Strong	Medium.
Lexington	Shallow loess over sandy material	Moderately steep	Strong	Medium.
Brandon	Shallow loess over gravelly material	Strongly sloping	Weak	Medium.
Loring	Deep loess (Miss. River)	Very gently sloping to moderately steep.	Strong	Medium.
Bosket	Old alluvium (Miss. River)	Nearly level to very gently sloping	Weak	Medium.
Dubbs	Old alluvium (Miss. River)	Very gently sloping to gently sloping	Medium	Medium.
Dundee	Old alluvium (Miss. River)	Nearly level to gently sloping	Medium	Strong.
Beulah	Old alluvium (Miss. River)	Gently sloping	Weak	Weak.
INTRAZONAL				
Planosols:				
Calloway	Deep loess	Very gently sloping to gently sloping	Strong	Strong.
Olivier	Old alluvium from loess	Nearly level to gently sloping	Strong	Strong.
Grenada	Deep loess	Very gently sloping to sloping	Strong	Strong.
Providence	Shallow loess over sandy material	Moderately steep	Strong	Strong.
Richland	Old alluvium	Very gently sloping to sloping	Strong	Strong.
Henry	Deep loess	Nearly level	Very strong	Strong.
Calhoun	Old alluvium	Nearly level to very gently sloping	Very strong	Strong.
Low-Humic Gley:				
Forestdale	Old alluvium	Nearly level	Weak	Weak.
Waverly	Recent alluvium (silty)	Nearly level	Weak	Weak.
Alligator	Recent alluvium (Miss. River)	Nearly level	Weak	Weak.
Dowling	Recent alluvium (Miss. River)	Nearly level	Weak	Weak.
Mhoon	Recent alluvium (Miss. River)	Nearly level	Weak	Weak.
Falaya	Recent alluvium (silty)	Nearly level	Weak	Medium.
Grumusols:				
Sharkey	Recent alluvium	Level to very gently sloping	Weak	Medium.
AZONAL				
Regosols:				
Guin	Gravel, sand, and clay	Moderately steep	Weak	Weak.
Kershaw	Sand	Moderately steep	Weak	Weak.
Natchez	Deep loess	Steep	Weak	Medium.
Alluvial soils:				
Vicksburg	Recent alluvium (silty)	Nearly level	Weak	Weak.
Robinsonville	Recent alluvium (Miss. River)	Nearly level	Weak	Weak.
Commerce	Recent alluvium (Miss. River)	Nearly level to very gently sloping	Weak	Weak.
Collins	Recent alluvium (silty)	Nearly level	Weak	Medium.

climate and living organisms, chiefly vegetation. The soils in the zonal order in this county are in the Gray-Brown Podzolic great soil group.

GRAY-BROWN PODZOLIC SOILS

Gray-Brown Podzolic soils have a comparatively thin organic and organic-mineral layer over a grayish-brown leached A horizon that rests upon an illuvial B horizon. The soils are developed under deciduous forest in a temperate moist climate. They have a surface covering of leaf litter from deciduous trees and a dark, thin, mild (only slightly or moderately acid) layer of humus somewhat mixed with mineral soil. In addition, they have a grayish-brown, crumb-structured loam A_1 horizon and a moderately heavy, blocky-structured, yellowish-brown, brown, brownish-yellow, or reddish-brown B horizon that becomes lighter colored with depth. The total depth of the solum varies considerably, but it seldom exceeds 4 feet. Podzolization is the chief process in the development of these soils (*2,8*).

Members of the Gray-Brown Podzolic soils in this county are the Memphis, Lintonia, Lexington, Brandon, Loring, Bosket, Dubbs, Dundee, and Beulah series.

Memphis series.—The soils of the Memphis series are representative of the Gray-Brown Podzolic great soil group. They occupy very gently sloping to moderately steep upland areas, and they are well drained. Gray silty material usually forms a coating of the surface of the structure peds, root channels, and cracks.

The following is a profile description of Memphis silt loam, very gently sloping phase, in a wooded area about 3 miles northwest of Eudora. This is an uneroded inclusion in the soil mapped as the eroded very gently sloping phase of Memphis silt loam.

A_0 1 to 0 inch, partly decomposed leaves and twigs.

A_1 0 to 2 inches, dark grayish-brown (10YR 4/2) very friable silt loam; moderate fine granular structure; strongly acid.

A_2 2 to 12 inches, brown (10YR 5/3) very friable silt loam; weak medium to fine granular to weak fine platy structure; strongly acid.

B_{21} 12 to 18 inches, brown (7.5YR 5/4) friable light silty clay loam; weak fine blocky structure; strongly acid.

B_{22} 18 to 36 inches, brown (7.5YR 5/4) friable silty clay loam; moderate medium blocky structure; slightly plastic when wet; strongly acid.

B_{23} 36 to 50 inches, brown (7.5YR 5/4) friable light silty clay loam; streaks of very pale brown (10YR 8/3) are along structural faces and mottles of dark yellowish-brown (10YR 4/4) are few, fine, and distinct; moderate medium coarse blocky structure; strongly acid.

C_1 50 to 100 inches, strong-brown (7.5YR 5/5) friable heavy silt loam; very pale-brown (10YR 8/3) and dark yellowish-brown (10YR 4/4) mottles that are common, distinct, and medium and fine; structureless (massive).

C_2 100 to 112 inches, brown to dark-brown (7.5YR 4/4) and dark yellowish-brown (10YR 4/4) friable silt loam; structureless (massive).

Lintonia series.—The soil of the Lintonia series developed from alluvium that washed from loess. It occurs on terraces. Grayish silt coatings, especially noticeable in dry seasons, may occur on structural faces. This soil is associated with soils of the Richland, Olivier, and Calhoun series. It is medium acid.

Lexington series.—In this county the soil of the Lexington series is mapped only in a complex with the Loring and Providence soils. It has formed on moderately steep uplands from loess that overlies sandy Coastal Plain material. The loessal layer is 18 to 36 inches thick. Lexington soil is medium to strongly acid. Although the series is placed in the Gray-Brown Podzolic group, it is more weathered than is common and is hence considered an intergrade to the Red-Yellow Podzolic group.

Brandon series.—The soil of the Brandon series is mapped only in a complex with soil of the Loring series. It occurs in strongly sloping areas and has formed from loess that overlies gravelly Coastal Plain material. The loess is 18 to 36 inches thick. The soil is strongly acid. It is considered to be an intergrade to the Red-Yellow Podzolic great soil group.

Loring series.—The Loring soils occur on gently sloping to moderately steep upland ridges and slopes. They have a weak fragipan layer at depths of 30 to 36 inches. This layer sometimes retards the downward movement of water. The soils are medium to strongly acid. The weak fragipan in the profile indicates that the soils are intergrades to the Planosol group.

Bosket series.—Bosket soils have formed from moderately fine, medium, and coarse-textured Mississippi River alluvium. They occur mostly on long, relatively narrow, nearly level to very gently sloping ridges on old natural levees. They are closely associated with soils of the Beulah, Dubbs, and Dundee series. The reaction is medium to slightly acid. These soils have some of the profile characteristics of the Alluvial group and some of the Prairie group.

Dubbs series.—Soils of the Dubbs series have formed from coarse-textured and fine-textured Mississippi River alluvium. They occupy very gently sloping to gently sloping long narrow ridges on old natural terraces. The moderately compact subsoil has distinct blocky structure, but it does not impede to any great degree the downward movement of water through the profile. These soils are slightly acid. They have some of the profile characteristics of the Alluvial group and some of the Prairie group. In this county Dubbs soils have profiles that are better developed than those of any soils of the Mississippi River Alluvial Plain.

Dundee series.—The soils of the Dundee series have developed from medium-textured Mississippi River alluvium. They occupy nearly level to gently sloping, moderately broad and narrow ridges on old natural levees. The reaction is medium to strongly acid. They have some of the characteristics of the Low-Humic Gley group and are considered to be intergrades to that group.

Beulah series.—In this county soil of the Beulah series occurs only in an undifferentiated group with soils of the Dundee series. It occurs on old natural levees and has formed from medium to moderately coarse-textured Mississippi River alluvium. It is medium acid in the surface soil and strongly acid in the subsoil. This soil has weakly expressed horizons and is therefore considered to be an intergrade to the Alluvial group.

Intrazonal soils

The intrazonal soils have more or less well-developed characteristics that reflect the dominating influence of some local factor of relief, parent material, or age over the normal effect of climate and vegetation. The profiles of intrazonal soils are more or less well developed. In this county the intrazonal order consists of Planosols, Grumusols, and Low-Humic Gley great soil groups.

PLANOSOLS

Planosols have eluviated surface horizons underlain by B horizons that are more strongly illuviated, cemented, or compacted than associated normal soils. They developed upon nearly flat upland surface under grass or forest vegetation in a humid or subhumid climate (*8*). Podzolization and gleization are soil-forming processes involved in their development. Characteristic of the Planosols is a well-defined layer of clay or cemented material that has accumulated at various depths below the surface in nearly level areas that have more or less restricted drainage.

In this county the Planosols have a fragipan at various depths. Fragipans are very compact horizons rich in silt or sand, or both, and usually relatively low in content of clay (*9*). The fragipan is more developed in some soils than in others. It is composed of a mottled grayish, semicompact or compact layer that restricts the movement of water through the profile. The fragipans in soils of this county are usually silty clay loam.

Members of the Planosols great soil group are the Calloway, Olivier, Grenada, Providence, Richland, Henry, and Calhoun series.

Calloway series.—The soils of the Calloway series have formed on uplands from deep loess. They are associated with Grenada soils. A gray, mottled, compact fragipan occurs at depths of 12 to 20 inches, and it restricts the movement of water through the profile.

The following is a profile description of Calloway silt loam, very gently sloping phase, in a cultivated field about 3½ miles northeast of Olive Branch and 1 mile south of the Mississippi-Tennessee boundary:

A_p 0 to 6 inches, dark yellowish-brown (10YR 4/4) friable silt loam; weak fine granular structure; some small dark-brown concretions; strongly acid.

B_1 6 to 12 inches, yellowish-brown (10YR 5/6), friable light silty clay loam; small dark-brown concretions; weak medium blocky structure; very strongly acid.

B_2 12 to 14 inches, light yellowish-brown (2.5Y 6/4) friable silty clay loam; many fine, dark-brown mottles, few to many dark-brown concretions; weak fine blocky structure; very strongly acid.

B_{3m} (pan) 14 to 42 inches, light-gray (2.5Y 7/2), firm to friable compact, silty clay loam; mottles many, distinct, and coarse; many dark-brown concretions; hard when dry, slightly plastic when wet; strongly acid.

C 42 inches +, yellowish-brown (10YR 5/4) friable silty clay loam; distinct medium mottles of dark yellowish brown (10YR 4/4) and light-gray (10YR 7/2) are common; hard when dry, friable when moist; strongly acid.

Olivier series.—Soils of the Olivier series have formed from old alluvium. They have a compact fragipan at depths of 15 to 24 inches that retards the downward movement of water. These soils occupy nearly level to gently sloping areas that border the bottom lands in the Loess Belt. Many dark-brown manganese concretions are on the surface and throughout the profile. The soils of this series are strongly acid.

Grenada series.—Soils of the Grenada series occur on uplands and have formed from deep loess. They have a fragipan layer at depths of 20 to 30 inches that somewhat retards the movement of water through the soil. The soils are strongly acid. The upper horizons are comparable to those of Gray-Brown Podzolic soils, but the presence of a distinct or prominent fragipan in the profile is the basis for placing the series in the Planosol group.

Providence series.—In this county the soil of the Providence series is mapped only in a complex with soils of the Lexington and Loring series. It has developed on uplands from a shallow layer of loess that overlies sandy Coastal Plain material. The fragipan occurs at depths of 20 to 30 inches. It lies a little above or at the boundary between the horizons of loess and Coastal Plain material. The Providence soil is strongly acid. It is considered to be a Planosol that intergrades to the Red-Yellow Podzolic group.

Richland series.—Soils of the Richland series occupy relatively broad, very gently sloping areas and narrow sloping strips on stream terraces. They have developed from old alluvium that washed from loess. A fragipan is at depths of 24 to 36 inches. Soils of this series are strongly acid. The upper horizons are comparable to those of Gray-Brown Podzolic soils, but the presence of a distinct or prominent fragipan in the profile is the basis for placing the series in the Planosol group.

Henry series.—The soil of this series has formed from deep loess in flat and depressed areas of uplands. A compact fragipan occurs at depths of 8 to 16 inches; usually it is at depths of less than 12 inches. This pan layer greatly retards the downward movement of water. The soil is strongly acid.

Calhoun series.—The soils of the Calhoun series occur at the lowest elevations of nearly level stream terraces. A well-developed fragipan is at depths of 8 to 15 inches. It retards the movement of water through the profile. These soils are strongly acid and have the poorest drainage of any stream-terrace soils.

LOW-HUMIC GLEY SOILS

Low-Humic Gley soils are defined as imperfectly to poorly drained soils with very thin surface horizons, moderately high in organic matter, over mottled gray and brown gleylike mineral horizons with a low degree of textural differentiation (*8*). The soil developed through the process of gleization.

Members of the Low-Humic Gley great soil group are the Forestdale, Waverly, Alligator, Dowling, Mhoon, and Falaya series.

Forestdale series.—The soil of the Forestdale series occupies old natural levees. It generally occurs between soils of the old natural levees and those of the slack-water areas. It has formed from moderately fine-textured to medium-textured Mississippi River alluvium.

The following is a profile description of Forestdale silty clay loam, nearly level phase:

A_p 0 to 6 inches, pale-brown (10YR 6/3) friable silty clay loam; weak fine crumb structure; medium to strongly acid.

B 6 to 30 inches, light-gray (10YR 7/2) firm to friable silty clay loam; mottles of strong-brown (7.5YR 5/6) are common, distinct, and medium; weak medium subangular blocky structure; strongly acid.

D 30 to 42 inches, light-gray (10YR 7/1) friable silt loam to very fine sandy loam; mottles of strong brown (7YR 5/6) are common, distinct, and medium; strongly acid.

Waverly series.—Soils of the Waverly series occupy slack-water areas on flood plains. They have formed from recent alluvium originating from loess. They are strongly acid.

Alligator series.—Soil of the Alligator series occurs in slack-water areas. The soil has formed from fine-textured Mississippi River alluvium. It is closely associated with soils of the Sharkey and Forestdale series. It is more acid and lighter colored, and it has more prominent

mottlings than Sharkey soils. It differs from the Forestdale soil chiefly in having a fine texture throughout the profile. It is medium acid.

Dowling series.—Soils of the Dowling series occur in depressions and have formed principally from fine-textured Mississippi River alluvium. They are closely associated with those of the Alligator and Sharkey series. Dowling soils are medium acid to neutral.

Mhoon series.—The soil of the Mhoon series has formed on recent natural levees from medium-textured and fine-textured Mississippi River alluvium. It occurs some distance from the river channel, where the recent natural levees grade into slack-water areas. This soil is closely associated with soils of the Robinsonville and Commerce series. It occupies lower elevations on the recent natural levees than the associated soils and has somewhat poorer drainage and a finer textured subsoil. It is neutral to alkaline in reaction. The soil has weakly expressed horizons and is therefore considered to be an intergrade to the Alluvial group.

Falaya series.—Soils of the Falaya series occur on flood plains of major streams. They have formed from recent alluvium that washed from loess. Soil of the series also occurs in an undifferentiated soil group with Waverly soil. Falaya silt loam is associated with soils of the Vicksburg, Collins, and Waverly series. It differs from Vicksburg and Collins soils in having poorer drainage and from Waverly soils in having better drainage. The soils of the Falaya series are medium to strongly acid. They have weakly expressed horizons and are therefore considered to be an intergrade to the Alluvial group.

GRUMUSOLS

Grumusols are a group of soils dominated by montmorillonitic clays (*4*). These soils are typically clay in texture, lack eluvial and illuvial horizons, have moderate to strong granular structure in the upper horizons, and have high coefficients of expansion and contraction upon wetting and drying. In the exchange complex of these soils, calcium and magnesium are dominant. Having high coefficients of expansion and contraction, the Grumusols shrink and swell markedly with changes in moisture content. In the process of shrinking and swelling, the soils crack, and materials from upper horizons drop down into lower ones. Thus, the soils are being churned or mixed continually, a process that partially offsets horizon differentation (*6*). Grumusols may have prominent A_1 horizons but lack B horizons. They have dull colors, as a rule, and are not well drained.

Sharkey clay has many of the features common to Grumusols. The profile texture throughout is dominantly montmorillonitic clay. The dark A_1 horizon and the evidence of gleization in the deeper horizons suggest placement of the Sharkey series in the Humic-Gley group. Laboratory analyses, however, show that the content of organic matter in the A_1 horizon of Sharkey clay is lower than that of normal Humic-Gley soils, and that it is more nearly that of typical Grumusols. Furthermore, the dark A_1 horizon is also characteristic of many Grumusols. Sharkey clay is classified tentatively, therefore, as a Grumusol that is an intergrade to the Low-Humic Gley group. It seems more poorly drained than typical of Grumusols, but it is not too wet for operation of the churning and mixing process. In this county the Sharkey series is the only member of the Grumusol group.

Sharkey series.—The soils of the Sharkey series occur in slack-water areas. They have formed from clayey Mississippi River alluvium and are slightly acid to alkaline. Uncultivated areas contain considerably more organic matter than cultivated areas.

The following is a profile description of Sharkey clay, level phase, in a cultivated field ¼ mile east of United States Highway No. 61, near the De Soto–Tunica County line:

A_p 0 to 4 inches, very dark gray (10YR 3/1) very firm clay; strong fine granular structure; plastic when wet; slightly acid.

C_g 4 to 24 inches, dark-gray (10YR 4/1) very firm clay; distinct medium to coarse mottles of dark brown (10YR 4/3); strong coarse blocky structure to structureless (massive); very plastic when wet, very hard when dry; neutral.

G 24 to 40 inches, dark-gray (10YR 4/1) very firm clay; distinct coarse mottles of dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4); structureless (massive); very plastic when wet, very hard when dry; neutral.

Azonal soils

The Azonal order is a group of soils without well-developed profile characteristics because of their youth, or because of conditions of parent material or relief that prevent the development of normal soil profile characteristics. In this county, the soils of the Azonal order are members of the Regosol and the Alluvial groups.

REGOSOLS

Regosols consist of deep unconsolidated rock (soft mineral deposits) in which few or no clearly expressed soil characteristics have developed. They are largely confined to recent sand dunes, and to loess and glacial drift of steeply sloping areas (*7*).

In De Soto County, the Regosols are derived from unconsolidated Coastal Plain deposits. Soils of the Guin, Kershaw, and Natchez series are members of the Regosols great soil group.

Guin series.—The soil of this excessively drained series has formed on uplands from Coastal Plain gravel, sand, and clay. Geologic erosion of the soil is relatively rapid on the moderately strong slopes. Erosion and slope have overbalanced the natural soil-forming processes, and very little profile development is evident. The soil is excessively drained and is strongly acid to extremely acid.

A profile description of Guin gravelly sandy loam, moderately steep phase, in a wooded area about 3 miles northeast of Love is as follows:

A_1 0 to 2 inches, dark grayish-brown (10YR 4/2) very friable gravelly sandy loam; some dark organic stain; strongly acid.

A_2 2 to 9 inches, brown (10YR 5/3) very friable gravelly sandy loam; structureless (single grain); approximately 25 percent of mass is made up of small to medium gravel; very strongly acid.

C_1 9 to 24 inches, red (2.5YR 5/8) firm gravelly sandy clay; indefinite structure; approximately 75 percent of mass is fine gravel, very little medium to large gravel; very strongly acid.

C_2 24 to 52 inches, red (2.5YR 4/8), friable, coarse sandy clay; weak medium subangular blocky structure; approximately 10 percent of mass is made up of medium to large gravel; extremely acid.

C_3 52 inches +, red (2.5YR 4/6) firm to friable gravelly coarse sandy clay; approximately 50 percent of mass consists of gravel of various sizes; extremely acid.

Kershaw series.—The soil of the Kershaw series has formed on uplands from Coastal Plain sand and loamy

sand. It occurs on moderately steep slopes that border the flood plains of the Coldwater River and lower reaches of Camp Creek. The soil is medium to very strongly acid and excessively drained. The Kershaw soil mapped in this county has a dark-colored A horizon.

A profile of Kershaw sand, moderately steep phase, in an area ½ mile west of United States Highway No. 51 north of the Coldwater River flood plain is as follows:

A_p 0 to 6 inches, dark reddish-brown (5YR 3/4) loose sand; structureless (single grain); medium acid.

C_1 6 to 24 inches, yellowish-red (5YR 5/6) loose sand; structureless (single grain); strongly acid.

C 24 to 42 inches +, reddish-yellow (5YR 7/8) loose sand; structureless (single grain); very strongly acid.

Natchez series.—The soil of the Natchez series occupies steep upland slopes in a relatively narrow strip along the bluff at the western edge of the Loess Hills. It has formed from thick beds of loess. Reaction is medium acid to slightly acid to alkaline. In some places the profile is calcareous below depths of 36 to 48 inches.

Following is a profile description of Natchez silt loam, steep phase, about 2 miles northwest of Eudora on the county line road at the loess bluff:

Normal profile—

A_{00} 2 to ½ inches, fresh leaves and twigs from hardwoods.

A_0 ½ to 0 inch, partly decomposed leaves and twigs.

A_1 0 to 3 inches, dark grayish-brown (10YR 4/2) to brown (10YR 5/3) very friable silt loam; weak fine granular structure; medium to slightly acid.

C_{11} 3 to 10 inches, yellowish-brown (10YR 5/4 to 5/6) friable silt loam; weak medium coarse blocky structure; blocks readily break into weak fine granules; medium to slightly acid.

C_{12} 10 to 30 inches, dark yellowish-brown (10YR 4/4) to yellowish-brown (10YR 5/6) friable light silt loam; weak coarse subangular blocky structure; blocks readily break into weak fine granules; slightly acid.

C_{13} 30 to 36 inches, brown (10YR 5/3) to yellowish-brown (10YR 5/4) friable silt loam, essentially structureless; slightly acid to neutral.

C_{21} 36 to 46 inches, yellowish-brown (10YR 5/4) friable silt loam, essentially structureless; alkaline.

C_{22} 46 to 144 inches, yellowish-brown (10YR 5/8) very friable silt loam; calcareous.

Buried profiles—

A_{1pb} 144 to 150 inches, brown (7.5YR 5/4), intermingled with pale brown (10YR 6/3), friable silt loam; structureless (massive).

B_{11b} 150 to 172 inches, very dark yellowish-brown (10YR 3/4) friable light silty clay loam splotched with dark brown (10YR 4/3); structureless (massive).

B_{12b} 172 to 196 inches, dark-brown (7.5YR 4/4) friable light silty clay loam; weak fine granular structure.

A_{1pb} 196 to 204 inches, dark-brown (7.5YR 4/4) friable silt loam; weak fine granular structure.

B_{11b} 204 to 228 inches, dark-brown (7.5YR 4/4) friable light silty clay loam; weak fine blocky structure; blocks easily broken into weak fine granules.

B_{12b} 228 to 246 inches, yellowish-red (5YR 4/6) friable silty clay loam; medium coarse subangular blocky structure.

B_{2b} 246 to 276 inches, red (2.5YR 4/8) silty clay; moderate coarse and medium subangular blocky structure; slightly plastic when wet; slightly finer texture in the lower part of the horizon.

C_b 276 inches +, yellowish-brown (10YR 5/6) friable silt loam; fingers of red (2.5YR 4/8) silty clay in the upper part.

ALLUVIAL SOILS

Alluvial soils developed from transported and relatively recently deposited material (alluvium) that is characterized by a weak modification (or none) of the original material by soil-forming processes (*8*). Soils of the Vicksburg, Robinsonville, Commerce, and Collins series are members of the Alluvial group.

Vicksburg series.—Soils of the Vicksburg series occur on the flood plains of many of the larger streams and some of the smaller tributaries. They have formed from silty alluvium originating from loess. They are well drained, nearly level, and medium acid.

The following is a profile of Vicksburg silt loam in a cultivated area 4 miles west of Hernando on the Middle road:

1. 0 to 8 inches, brown (10YR 5/3) very friable silt loam; weak fine crumb structure; medium acid.
2. 8 to 32 inches, yellowish-brown (10YR 5/4) to light yellowish-brown (10YR 6/4) very friable silt loam; weak fine crumb structure; medium acid.
3. 32 to 50 inches, brown (10YR 5/3) friable silt loam; a few splotches of pale brown (10YR 6/3); some dark-brown concretions; medium acid.

Robinsonville series.—The soil of the Robinsonville series occurs on recent natural levees near the present channel or recent channels of the Mississippi River. The soil has formed from coarse-textured and medium-textured alluvium deposited by the river. This nearly level well-drained soil is neutral to alkaline.

Commerce series.—The soils of the Commerce series are on recent natural levees. They have formed from fine-textured and medium-textured Mississippi River alluvium. These soils are associated with soils of the Robinsonville and Mhoon series. They are neutral to alkaline. They show some effects of gleization and are therefore considered intergrades to the Low-Humic Gley group.

Collins series.—The soils of the Collins series occur on bottoms or flood plains. They have formed from silty alluvium that washed from loess. These soils are associated with those of the Vicksburg and Falaya series. They are medium acid in the upper part to slightly acid in the lower part. They show some effects of gleization and are therefore considered intergrades to the Low-Humic Gley group.

Additional Facts About De Soto County

This section of the report discusses history and development; industries, transportation, and markets; water supplies; forests and wildlife; and the agriculture of the county.

History and Development

De Soto County was formed in 1836 from lands ceded to the United States by the Chickasaw Indians. The original county consisted of about 864 square miles, but it was divided in 1873 to form part of Tate County.[2] The county was named for Hernando De Soto, and it is located near the point where he first saw the Mississippi River.

The early settlers in De Soto County came from the Carolinas, Virginia, Georgia, Tennessee, and Alabama.

[2] HORN, A. G. HISTORY OF DE SOTO COUNTY, MISSISSIPPI, 1836–1861. An unpublished thesis submitted as part of the requirements for the degree of Master of Arts in the Department of History of George Peabody College. 66 pp., 1929.

The first settlements were established in the northern part of the county; later settlements were in the southern part. Many early settlers brought along their slaves and established large plantations. Some plantation owners became wealthy by growing cotton.

Early in the eighteen fifties, a plank road was built from Hernando to Memphis. It was 22 miles long, had toll gates every 8 miles, and passed through a section that had many homes built in colonial style. Big plantations were the rule, but there were also some small farms.

Another company was organized in Tennessee in 1853 to build a plank road from Memphis through the eastern part of De Soto County. This road was important in the early development of that part of the county.

In 1855 the first railroad was built from Memphis, Tenn., southward through the county by way of Hernando. It had an important part in the early development of the county.

Hernando, the county seat, had a population in 1950 of 1,206 and is the largest town in the county. Other towns and small trading centers are Olive Branch, Lake Cormorant, Horn Lake, Nesbitt, Eudora, Walls, Cockrum, Love, Lewisburg, Mineral Wells, Ingrams Mill, and Miller.

There are nine consolidated schools, three of which are high schools, and a junior college in De Soto County. Many grade schools are scattered throughout the county.

Churches are within easy access to all the people. All communities have rural mail delivery and electric power; some have telephones. The larger towns have natural gas.

Industries, Transportation, and Markets

Agriculture is the main occupation in De Soto County. A cheese plant located at Olive Branch processes the excess milk of many of the dairy farmers of the county. There are 24 cotton gins. A few cotton plantations own and operate gins. Several gravel pits located in the county supply the gravel used on county roads. Some gravel is hauled out of the county to surrounding areas. A few small sawmills are operated by farmers when they are not busy with crops.

Three railroads are in De Soto County. The Illinois Central Railroad runs south from Memphis through Horn Lake, Hernando, and Love to Jackson and New Orleans. The Yazoo and the Mississippi Valley Railroad, a branch of the Illinois Central, runs southwest from Memphis through Walls and Lake Cormorant to Clarksdale, Vicksburg, and beyond. The St. Louis and San Francisco Railway runs southeast from Memphis through Mineral Wells, Olive Branch, and Miller on the way to Birmingham.

Three United States Highways, Nos. 78, 51, and 61, also cross the county. State Highway No. 301 runs north and south through Eudora. Most of the secondary roads of De Soto County are graveled and can be traveled by automobile throughout the year. All parts of the county are accessible by secondary roads.

Adequate transportation is provided by these railroads and roads to markets in Memphis and St. Louis to the north and in Vicksburg, Birmingham, and New Orleans to the south. The principal market for this area is Memphis, Tenn. Products such as butter, eggs, and chickens are bought and sold at local trading centers well distributed throughout the county.

Water Supplies

On the Mississippi River Alluvial Plain, the supply of water is adequate for most purposes. Flowing artesian wells and shallow wells furnish water for homes and livestock. Horn Lake is used mainly as a fishing resort.

Water in the Loess Hills is not so plentiful, but supplies are adequate. Most water for domestic use is pumped from wells drilled to Coastal Plain strata at depths of 30 to 100 feet. Some farmers obtain water from cisterns supplied by rainwater. Most farmers have ponds to supply water to livestock when intermittent streams go dry. Many farm ponds are also stocked with fish. Arkabutla Lake is used mainly as a flood-control reservoir.

Forests and Wildlife

Nearly all the forested areas have been cut over. Forests consist mainly of oak, hickory, cherry, walnut, hackberry, elm, holly, gum, pecan, ash, maple, dogwood, yellow-poplar, birch, willow, beech, sycamore, sassafras, and honeylocust. Cedar and bald cypress grow in the wetter areas. Most forested areas are on the steep bluffs along the western edge of the Loess Hills, along the Coldwater River and its main tributaries, and on the Mississippi River Alluvial Plain that is not protected by levees.

Game and fish are protected by game laws. Streams and lakes are well stocked with fish. Bass and bluegill are stocked in farm ponds. Commercial fishing is allowed in Arkabutla Lake and in the Mississippi River. Many quail, ducks, and some wild geese are in the county.

Agriculture

Soil and cattle are the principal resources of the county. Many of the soils are inherently fertile and capable of good yields if properly managed. Those on uplands and terraces in the Loess Hills are subject to severe erosion if slopes are over 5 percent. Erosion control must be practiced. Soils of the Loess Hills need applications of lime, nitrogen, phosphate, and potash to obtain the highest yields. Soils of the Mississippi River Alluvial Plain need nitrogen.

Land use

Cotton has been the major crop in De Soto County since the first settlers arrived. According to the United States Census, the cotton acreage increased and the yield per acre declined from 1880 to 1933. This trend changed when acreage controls began in 1934. According to the 1954 census, cotton was grown on 40,677 acres, or 42.4 percent of all land from which crops were harvested. About 72 percent of all farms are classified as cotton farms.

Livestock and livestock products rank next to cotton in producing cash income for De Soto County farmers. Consequently, a large acreage is used for pasture and feed crops. However, not all livestock feed is produced within the county. The 1954 census states that approximately 42,000 acres were used for hay, silage, and grain, and an additional 131,923 acres were used for pasture.

Land in farms was distributed as follows:

	Acres
Cropland total	154, 230
Cropland harvested	95, 840
Cropland used only for pasture	44, 120
Cropland not harvested and not pastured	14, 270
Woodland total	48, 386
Woodland pastured	23, 928
Woodland not pastured	24, 458
Other pasture (not cropland and not woodland)	63, 875
Other land (houses, lots, roads, wasteland, etc.)	19, 103

Farm crops

The acreage of the principal crops as reported by the United States census is given for stated years in table 7.

On the Mississippi River Alluvial Plain, nearly all of the cleared land is in cultivation. Cotton is the main crop. The average yield of cotton in this area is more than a bale per acre. In the Loess Hills, more than half of the cultivated areas are used for cotton. The yield of cotton per acre is less than that of the Mississippi River Alluvial Plain. Since cotton is the main source of farm income, it is usually grown on the most productive soils. Acreage allotments, improved methods of farming, fertilization, insect control, and better varieties of crops have helped to increase the yields of cotton.

TABLE 7.—*Acreage of the principal crops and number of fruit and nut trees and grapevines of bearing age in stated years*

Crop	1929	1939	1949	1954
	Acres	*Acres*	*Acres*	*Acres*
Corn, for all purposes	29, 874	39, 436	26, 356	26, 027
Sorghum, for all purposes	311	676	1, 009	2, 669
Small grains:				
Oats, threshed or combined	43	363	1, 109	2, 169
Other grain, threshed or combined	(1)	(1)	165	2, 651
Annual legumes (grown alone):				
Soybeans, harvested for beans	157	167	2, 298	8, 036
Cowpeas, harvested for dry peas	620	6, 522	675	986
Hay:				
Alfalfa	163	151	263	96
Lespedeza	(1)	8, 158	11, 720	5, 056
Small grains cut for hay	21	48	80	621
Other hay cut	4, 798	1, 555	988	3, 493
Soybeans, cut for hay	(1)	(1)	1, 299	1, 071
Cowpeas, cut for hay	(1)	(1)	491	556
Cotton	78, 709	50, 523	51, 810	40, 677
Vegetables, harvested for sale	361	161	1, 127	305
	Number [2]	*Number* [2]	*Number* [2]	*Number*
Apple trees	1, 759	2, 228	2, 422	2, 280
Peach trees	5, 769	9, 677	6, 243	4, 634
Pear trees	1, 078	2, 818	1, 787	852
Plum and prune trees	306	443	269	113
Grapevines	212	511	447	128
Pecan trees	440	154	548	215

[1] Not reported.
[2] One year later than crop year given at head of column.

Corn is the chief grain, and it is grown extensively throughout the county. The average yield is rather low, but many farmers have produced over 100 bushels per acre in the last few years. Yields can be greatly increased on many farms if management is improved.

Oats are grown for pasture and grain. Good yields can be obtained from many soils not suited to corn if frosts do not damage the crop. Winter wheat will produce good yields but is not grown extensively.

Soybeans grow well on most soils of the Mississippi River Alluvial Plain and on many of those in the Loess Hills. In the Mississippi River Alluvial Plain the crop is grown for oil primarily on the heavier textured soils. Soybeans are not grown extensively in the Loess Hills.

Lespedeza is the main hay crop, and most of it is grown in the Loess Hills. It is often grown in rotation with fall-planted oats and is seeded in the oats early in spring. Cowpeas, soybeans, sericea lespedeza, and alfalfa are also grown for hay.

Fruits and vegetables are grown for home use and for market. About 74 percent of the farm income in 1954 was obtained from the sale of farm crops.

Livestock and livestock products

De Soto County is one of the leading dairy areas in the State. In 1954, there were 192 farms classified by the United States census as dairy farms. Many dairy cows are of purebred stock and the others are good grade milk cows. Milk cows in the county numbered 16,863 in 1954. There are a number of herds of good grade beef cattle in the county, as well as some registered purebred herds.

Most work animals are mules. Some horses are kept primarily as saddle stock and are of fair to good quality. The number of mules has declined because of replacement by tractors. Many mules are still used by small farmers in the Loess Hills.

Most hogs are raised for home use, but some are sold in Memphis. Breeds are mixed, and the quality varies from poor to good.

The number of livestock as reported by the census is shown in table 8.

TABLE 8.—*Number of livestock on farms in stated years*

Livestock	1930	1940	1950	1954
	Number	*Number*	*Number*	*Number*
Horses and colts	2, 061	[1] 1, 728	2, 833	1, 697
Mules and mule colts	6, 908	[1] 6, 095	6, 194	4, 157
Cattle and calves	21, 149	[1] 22, 982	34, 481	39, 668
Hogs and pigs	13, 296	[2] 13, 874	13, 844	12, 505
Chickens	[1] 84, 241	[1] 100, 236	[2] 80, 706	[2] 90, 038
Turkeys raised	804	908	750	1, 357

[1] Over 3 months old. [2] Over 4 months old.

Permanent pastures

The number of cattle and the area in pasture have increased in the county for several years. The United States census reported 75,084 acres in pasture in 1930 and 131,923 acres in 1954. More attention is given to the selection of soils for pasture, and more pastures are being located on the soils that are too steep for crops. Many of the steeper soils that some farmers still use for crops and

many of the more poorly drained bottom soils could be profitably used for pasture.

Pastures in the Mississippi River Alluvial Plain are used primarily by dairy cattle to produce milk for home use. The pastures are usually small. They are located more for convenience of the operator than for their suitability to the soil. Bermudagrass and dallisgrass in mixtures with lespedeza and clover, and mixtures of fescue and whiteclover, are the forage plants used for improved pastures.

Well-managed pastures are profitable because the soils are excellent for pasture, the grazing season is long, and markets for livestock and livestock products are nearby.

Tenure and size of farms

In 1954, 69.3 percent of the farms were operated by tenants, 30.5 percent by owners or part owners, and 0.2 percent by managers, according to the United States census. Many tenants rent the land and furnish their own equipment and animals. Under this system, the tenant usually keeps two-thirds of the cotton and three-fourths of the corn. Some tenants pay rent in cash. Most of the large farms, especially those in the Mississippi River Alluvial Plain, are operated by tenants under the direction of managers. Under this system, the owner or operator furnishes all equipment, seed, and fertilizer and advances credit for food and personal expenses. The owner or operator receives from the sharecropper half of the cotton and interest on money loaned. The sharecropper usually gets a small patch of corn.

The 1954 census reported 3,840 farms in De Soto County, and the average farm contained 74.4 acres. Farms by size in 1954 were as follows: 0 to 29 acres, 2,400 farms; 30 to 99 acres, 890 farms; 100 to 499 acres, 469 farms; over 500 acres, 81 farms. Most of the farms in the Mississippi River Alluvial Plain are large; a few large farms are in the Loess Hills.

Farm equipment

Tractors have been replacing mules on many farms. On some of the larger farms, especially in the Mississippi River Alluvial Plain, tractors are used exclusively. Trucks, automobiles, telephones, and electricity have all added to the convenience and comfort of the farmers.

The 1954 census show that 3,558 farms had electricity and various kinds of electric home appliances. Among all the farms in the county, 633 had telephones, 700 had piped water, 1,463 had automobiles, 619 had tractors, and 1,170 had trucks. A few farms had cornpickers, pick-up hay balers, field forage harvesters, grain combines, grinders, and milking machines.

Engineering Applications[3]

This soil survey report for De Soto County, Miss., contains information that can be used by engineers to:

(1) Make soil and land-use studies that will aid in the selection and development of industrial, business, residential, and recreational sites.

(2) Assist in designing drainage and irrigation structures and in planning dams and other structures for water and soil conservation.

(3) Make reconnaissance surveys of soil and ground conditions that will aid in selecting highway and airport locations and in planning detained soil surveys for the intended locations.

(4) Locate sand and gravel for use in structures.

(5) Correlate pavement performance with types of soil and thus develop information that will be useful in designing and maintaining the pavements.

(6) Determine the suitability of soil units for cross-county movements of vehicles and construction equipment.

(7) Supplement information obtained from other published maps and reports and aerial photographs, for the purpose of making soil maps and reports that can be readily used by engineers.

The mapping and the descriptive report are somewhat generalized, however, and should be used only in planning more detailed field surveys to determine the in-place condition of the soil at the site of the proposed engineering construction.

Soil Science Terminology

Some of the terms used by the agricultural soil scientist may be unfamiliar to the engineer, and some words—for example, soil, clay, silt, sand, aggregate, and granular—may have special meanings in soil science. Most of these terms, as well as other special terms that are used in the soil survey report, are defined in the glossary. Aggregate and topsoil, which are not included in the glossary, are defined as follows:

Aggregate: A cluster of primary soil particles held together by internal forces to form a clod or fragment.

Topsoil: Presumably fertile soil material used to topdress roadbanks, gardens, and lawns.

Soil Test Data and Engineering Classifications

To be able to make the best use of the soil maps and the soil survey reports, the engineer should know the physical properties of the soil materials and the in-place condition of the soil. After testing soil materials and observing the behavior of soils when used in engineering structures and foundations, the engineer can develop design recommendations for the soil units delineated on the maps.

Soil test data

Soil samples from the principal soil type of each of 11 extensive soil series were tested in accordance with standard procedures (*1*) to help evaluate the soils for engineering purposes. The test data are given in table 9. However, the samples from soils developed from thin loess over Coastal Plain deposits were obtained at depths of less than 5 feet, and they are not representative of the materials that will be encountered in deep excavations.

The engineering soil classifications in table 9 are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. Mechanical analyses were made by combined sieve and hydrometer methods. Percentage of clay obtained by the hydrometer method should not be used in naming soil texture classes.

The liquid limit and plastic limit tests measure the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a solid to semisolid or plastic state. As the moisture content is further increased, the material changes from the plastic to a liquid

[3] This section was prepared by the Division of Physical Research, Bureau of Public Roads and Soil Survey, Soil Conservation Service. Test data in table 9 were obtained in the Soils Laboratory, Bureau of Public Roads.

TABLE 9.—*Engineering test data* [1] *for*

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth	Horizon	Moisture-density: Maximum dry density	Moisture-density: Optimum moisture	Mechanical analysis [2]: Percentage passing sieve [3]: 1½-in.	Mechanical analysis [2]: Percentage passing sieve [3]: 1-in.
			Inches		*Lb. per cu. ft.*	*Percent*		
Brandon silt loam:								
NE¼NE¼ sec. 11, T. 3 S., R. 7 W.	Loess (25 inches) over Coastal Plain deposits.	88997	1–8	A_2	105	16	----------	----------
		88998	8–25	B_2	110	17	----------	----------
		88999	25+	C	121	12	100	92
Calloway silt loam:								
SW¼SW¼ sec. 24, T. 1 S., R. 6 W.	Loess (5 to 10 feet or more) over Coastal Plain deposits.	88992	0–8	A_p	104	17	----------	----------
		88993	8–22	B_2	105	19	----------	----------
		88994	22–42	P_{an}	106	19	----------	----------
		88995	42+	C	109	17	----------	----------
Collins silt loam:								
SW¼SE¼ sec. 7, T. 2 S., R. 6 W.	Alluvium	88996	10–24	--------	106	16	----------	----------
Grenada silt loam:								
SW¼SW¼ sec. 13, T. 1 S., R. 6 W.	Loess (4 to 16 feet) over Coastal Plain deposits.	88989	0–6	A_p	106	16	----------	----------
		88990	6–16	B_2	108	18	----------	----------
		88991	30–38	C_2	106	18	----------	----------
Henry silt loam:								
NW¼SE¼ sec. 14, T. 1 S., R. 6 W.	Loess	88986	0–8	A	99	17	----------	----------
		88987	8–26	B	109	15	----------	----------
		88988	26–42	C	110	17	----------	----------
Lexington silt loam:								
SE¼SE¼ sec. 13, T. 4 S., R. 8 W.	Loess (2 feet) over Coastal Plain deposits.	89006	0–4	A_p	101	18	----------	----------
		89007	10–20	B_2	111	15	----------	----------
		89008	24–46	B_3 and C	121	12	----------	----------
		89009	46+	D	117	12	----------	----------
Lintonia silt loam:								
SE¼NW¼ sec. 18, T. 4 S., R. 8 W.	Alluvium (terrace)	89010	0–6	A_p	104	17	----------	----------
		89011	12–20	B_2	105	20	----------	----------
		89012	40+	C_2	107	18	----------	----------
Loring silt loam:								
SE¼SE¼ sec. 5, T. 2 S., R. 5 W.	Loess	89000	2–6	A_2	105	17	----------	----------
		89001	12–24	B_2	107	18	----------	----------
		89002	32–42	B_3	106	19	----------	----------
Memphis silt loam:								
NE¼NE¼ sec. 5, T. 3 S., R. 9 W. (mottled subsoil phase).	Loess	89013	2–8	A_2	103	16	----------	----------
		89014	20–32	B_{22}	106	18	----------	----------
		89015	36–50	B_{23}	108	18	----------	----------
		89016	100–112	C_2	107	17	----------	----------
Olivier silt loam:								
SW¼SW¼ sec. 34, T. 3 S., R. 9 W.	Alluvium (terrace)	89017	2–8	A_p	107	16	----------	----------
		89018	12–22	B_2	106	18	----------	----------
		89019	26–37	P_{an}	106	19	----------	----------
		89020	56–62	C	107	19	----------	----------
Richland silt loam:								
NE¼NE¼ sec. 5, T. 4 S., R. 9 W.	Alluvium	89021	2–8	A_p	98	20	----------	----------
		89022	18–24	A_3B_1	107	18	----------	----------
		89023	34–42	B_3	107	18	----------	----------
		89024	60–72	C	109	18	----------	----------
SE¼SE¼ sec. 23, T. 3 S., R. 7 W.	Alluvium	89003	2–10	A_2	102	18	----------	----------
		89004	14–24	B_2	107	18	----------	----------
		89005	32–42	C	106	19	----------	----------

[1] Tests performed by Bureau of Public Roads according to standard procedures of the American Association of State Highway Officials (A. A. S. H. O.) (*1*).

[2] According to the American Association of State Highway Officials Designation: T 88. Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the A. A. S. H. O. procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 mm. in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 mm. in diameter is excluded from calculations of grain-size fractions.

soil samples taken from 11 soil profiles

Mechanical analysis [2]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve [3]							Percentage smaller than [3]—							
¾-in.	⅜-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			A. A. S. H. O.[4]	Unified [5]
----	----	----	100	99	98	97	87	56	17	12	27	5	A-4 (8)	ML-CL.
----	100	99	99	96	93	91	85	61	28	24	36	14	A-6 (10)	CL.
86	75	69	66	59	53	47	44	39	15	12	28	11	A-6 (3)	GC.
----	----	----	100	97	96	95	92	64	23	17	31	8	A-4 (8)	ML-CL.
----	----	----	100	99	99	98	94	76	33	27	41	18	A-7-6 (11)	CL.
----	----	----	----	----	100	99	95	74	30	25	42	20	A-7-6 (12)	CL.
----	----	----	----	----	----	100	94	63	24	19	37	15	A-6 (10)	CL.
----	----	----	----	----	----	100	95	62	19	13	27	5	A-4 (8)	ML-CL.
----	----	----	100	99	99	99	92	64	20	16	27	6	A-4 (8)	ML-CL.
----	----	----	----	----	----	100	97	76	33	25	37	15	A-6 (10)	CL.
----	----	----	----	----	----	100	96	67	30	24	41	19	A-7-6 (12)	CL.
----	----	----	100	97	97	96	91	66	21	15	30	6	A-4 (8)	ML-CL.
----	----	----	100	96	95	94	92	77	22	16	26	6	A-4 (8)	ML-CL.
----	----	----	----	----	----	100	92	62	28	22	34	15	A-6 (10)	CL.
----	----	----	----	100	99	99	87	48	16	14	30	6	A-4 (8)	ML-CL.
----	----	----	100	97	90	87	83	62	27	23	33	13	A-6 (9)	CL.
----	----	----	100	91	69	61	58	43	18	15	27	11	A-6 (6)	ML-CL.
----	----	----	100	78	36	18	18	14	6	4	NP	NP	A-2-4 (0)	SM.
----	----	----	100	99	98	97	87	50	17	13	26	4	A-4 (8)	ML-CL.
----	----	----	----	----	----	100	95	73	33	28	42	19	A-7-6 (12)	CL.
----	----	----	----	----	----	100	94	66	27	22	37	14	A-6 (10)	ML-CL.
----	----	----	----	----	----	100	94	56	20	14	29	5	A-4 (8)	ML-CL.
----	----	----	----	----	----	100	93	68	34	28	41	17	A-7-6 (11)	ML-CL.
----	----	----	----	----	----	100	94	69	30	24	43	22	A-7-6 (13)	CL.
----	----	----	----	----	----	100	91	55	16	10	23	2	A-4 (8)	ML.
----	----	----	----	----	----	100	92	66	31	26	41	17	A-7-6 (11)	ML-CL.
----	----	----	----	----	----	100	91	62	26	21	37	15	A-6 (10)	CL.
----	----	----	----	----	----	100	91	61	19	14	33	11	A-6 (8)	ML-CL.
----	----	----	----	----	----	100	90	57	21	17	27	5	A-4 (8)	ML-CL.
----	----	----	----	----	----	100	93	66	28	23	37	13	A-6 (9)	ML-CL.
----	----	----	----	----	----	100	95	70	28	23	36	12	A-6 (9)	ML-CL.
----	----	----	----	----	----	100	93	67	26	22	41	19	A-7-6 (12)	CL.
----	----	----	----	----	----	100	92	60	19	13	33	8	A-4 (8)	ML-CL.
----	----	----	----	----	----	100	93	67	30	25	38	14	A-6 (10)	ML-CL.
----	----	----	----	----	----	100	93	65	23	19	32	9	A-4 (8)	ML-CL.
----	----	----	----	----	----	100	95	68	25	19	34	12	A-6 (9)	ML-CL.
----	----	----	----	----	100	99	94	67	19	13	30	6	A-4 (8)	ML-CL.
----	----	----	----	----	----	100	96	70	27	25	35	13	A-6 (9)	ML-CL.
----	----	----	100	99	99	99	95	76	30	25	40	18	A-6 (11)	CL.

The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

[3] Based on total material.

[4] According to the Classification of Soils and Soil-Aggregate Mixtures for Highway Purposes, A. A. S. H. O. Designation: M 145-49.

[5] According to The Unified Soil Classification System (*11*).

state. The plastic limit is the moisture content at which the soil material passes from a solid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and plastic limit. It indicates the range of moisture content within which a soil material is plastic.

Table 9 also gives compaction (moisture-density) data for the tested soils. If a soil material is compacted at successively higher moisture contents, assuming that the compactive effort remains constant, the density of the compacted material will increase until the "optimum moisture content" is reached. After that, the density decreases with increase in moisture content. The highest dry density obtained in the compaction test is termed "maximum dry density." Moisture-density data are important in earthwork, for as a rule optimum stability is obtained if the soil is compacted to about the maximum dry density, when it is at approximately the optimum moisture content.

Engineering classification systems

Most highway engineers classify soil materials in accordance with the system approved by the American Association of State Highway Officials (*1*). In this system, soil materials are classified in seven principal groups. The groups range from A–1, consisting of gravelly soils of high bearing capacity, to A–7, consisting of clay soils having low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. Group indexes range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses, following the soil group symbol, in the next to last column of table 9. The principal characteristics according to which soils are classified in this system are shown in table 10.

Some engineers prefer to use the Unified Soil Classification system (*11*). In this system, soil materials are identified as coarse-grained (8 classes), fine-grained (6 classes), or highly organic. The principal characteristics of the 15 classes of soil are given in table 11. The classification of the tested soils according to the Unified system is given in the last column of table 9.

Soil Engineering Data and Recommendations

Some of the engineering information can be obtained from the soil map. It will often be necessary, however, to refer to other sections of the report, particularly to the sections: General Relations and Associations of Soils; Description of the Soils; and Genesis, Morphology, and Classification of Soils.

A summary of the principal engineering features of the soils is given in table 12. A more detailed estimate of the normal range in physical properties, by layers, of some of the soils in De Soto County is given in table 13. Each soil listed in table 13 should be representative of the physical properties of the other members of its series. The depths of the soil layers shown are the same as given in the typical profile descriptions in the section Description of the Soils. The thicknesses of layers, however, vary, and in some soils the upper layers have been lost or reduced through erosion.

The permeability of each soil layer is important in planning the drainage of a farm. Layers of soil that impede drainage or that are very permeable and allow easy drainage in comparison with adjacent layers may greatly affect the foundation conditions for engineering construction. Permeability depends mainly on soil texture and structure, but it may be affected by other physical properties of soils. Soil structure and consistence and the content of organic matter affect the moisture-holding capacity of soils. These factors should be considered in the design of irrigation systems.

Most soils in the county are acid, but a few are alkaline, particularly in the subsoil and parent material. It is probable that calcareous loess (Memphis soils) is less susceptible than acid loess to slumping in vertical back slopes of road cuts.

Soils whose volume changes greatly with variations in moisture generally are not suitable for road embankments or the upper parts of earth dams. Materials used for road subgrade or pavement foundation should have a low shrink-swell potential.

Table 13 shows the suitability of the various soils as sources of topsoil to aid in the revegetation of embankments, road shoulders, ditches, and cut slopes. Road shoulders that are intended to support only limited traffic should preferably be built of sandy loams or loamy sands.

Table 14 classifies soil features that are important in the construction of highways. The data are based on experiences with the same kinds of soils in other counties and on information from other sections in this report. Most of the main soil problems in highway construction are caused by physical characteristics of soil materials and by drainage. Bedrock is at such great depths that it presents no problems in highway engineering.

The ratings given in table 14 for suitability of soils for earthwork during winter and early spring are based on drainage factors and on the workability of soil materials when wet. During the December–April period (1) rainfall is distributed evenly and averages more than 4 inches per month, (2) soil materials may not dry to the desired moisture content for earthwork unless construction is delayed or artificial means for drying the materials are used, and (3) the water table in most soils is at highest elevations for the year. Only the Kershaw sand is rated as well adapted to earthwork during winter and early spring. This soil is very permeable, and it dries rapidly after becoming wet. In addition, its water table is below the normal depths of excavation.

Earthwork can be continued in the gravelly or sandy Coastal Plain materials of the Brandon, Guin, Lexington, and Providence soils during winter and early spring. However, construction with the finer textured materials of these soils will be difficult. Earthwork in sandy materials of the natural levees (Bosket and Robinsonville soils) is limited by the nearness of the water table. Earthwork in loess may be restricted, because proper compaction of this material is not possible if the content of moisture is only slightly in excess of optimum for compaction.

TABLE 10.—*Classification of soils by American Association of State Highway Officials* [1]

General classification	Granular materials (35 percent or less passing No. 200 sieve)							Silt–clay materials (more than 35 percent passing No. 200 sieve)				
Group classification	A–1		A–3	A–2				A–4	A–5	A–6	A–7	
	A–1–a	A–1–b		A–2–4	A–2–5	A–2–6	A–2–7				A–7–5	A–7–6
Sieve analysis:												
Percent passing—												
No. 10	50 maximum.											
No. 40	30 maximum.	50 maximum.	51 minimum.									
No. 200	15 maximum.	25 maximum.	10 maximum.	35 maximum.	35 maximum.	35 maximum.	35 maximum.	36 minimum.	36 minimum.	36 minimum.	36 minimum.	36 minimum.
Characteristics of fraction passing No. 40 sieve:												
Liquid limit			NP [2]	40 maximum.	41 minimum.	40 maximum.	41 minimum.	40 maximum.	41 minimum.	40 maximum.	41 minimum.	41 minimum.
Plasticity index	6 maximum.	6 maximum.	NP	10 maximum.	10 maximum.	11 minimum.	11 minimum.	10 maximum.	10 maximum.	11 minimum.	11 minimum [3].	11 minmum. [3]
Group index	0	0	0	0	0	4 maximum.	4 maximum.	8 maximum.	12 maximum.	16 maximum.	20 maximum.	20 maximum.
Usual types of significant constituent materials.	Stone fragments, gravel, and sand.	Stone fragments, gravel, and sand.	Fine sand.	Silty gravel and sand.	Silty gravel and sand.	Clayey gravel and sand.	Clayey gravel and sand.	Nonplastic to moderately plastic silty soils.	Highly elastic silts.	Medium plastic clays.	Highly plastic clays.	Highly plastic clays.
General rating as subgrade.	Excellent to good.							Fair to poor.				

[1] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (pt. 1, ed. 7): A. A. S. H. O. Designation: M 145–49 (*1*)

[2] NP=nonplastic.

[3] Plasticity index of A–7–5 subgroup is equal to or less than LL minus 30. Plasticity index of A–7–6 subgroup is greater than LL minus 30.

TABLE 11.—*Characteristics of soil groups in Unified Soil Classification System* [1]

Major divisions	Group symbol	Soil description	Value as foundation material [2]	Value as base course directly under bituminous pavement	Value for embankments	Compaction: Characteristics and recommended equipment	Approximate range in A.A.S.H.O. maximum dry density [3]	Field (in-place) CBR	Subgrade modulus, k	Drainage characteristics	Comparable groups in A.A.S.H.O. classification
Coarse-grained soils (*50 percent or less passing No. 200 sieve*):							*Lb./cu. ft.*		*Lb./sq. in./in.*		
Gravels and gravelly soils (*more than half of coarse fraction retained on No. 4 sieve*).	GW	Well-graded gravels and gravel-sand mixtures; little or no fines.	Excellent	Good	Very stable; use in pervious shells of dikes and dams.	Good; use crawler-type tractor, pneumatic-tire roller, or steel-wheel roller.	125–135	60–80	300+	Excellent	A-1.
	GP	Poorly graded gravels and gravel-sand mixtures; little or no fines.	Good to excellent.	Poor to fair	Reasonably stable; use in pervious shells of dikes and dams.	Same	115–125	25–60	300+	Excellent	A-1.
	GM	Silty gravels and gravel-sand-silt mixtures.	Good	Poor to good	Reasonably stable; not particularly suited to shells, but may be used for impervious cores or blankets.	Good, but needs close control of moisture; use pneumatic-tire or sheepsfoot roller.	120–135	20–80	200–300+	Fair to practically impervious.	A-1 or A-2.
	GC	Clayey gravels and gravel-sand-clay mixtures.	Good	Poor	Fairly stable; may be used for impervious core.	Fair, use pneumatic-tire or sheepsfoot roller.	115–130	20–40	200–300	Poor to practically impervious.	A-2.
Sands and sandy soils (*more than half of coarse fraction passing No. 4 sieve*).	SW	Well-graded sands and gravelly sands; little or no fines.	Good	Poor	Very stable; may be used in pervious sections; slope protection required.	Good; use crawler-type tractor or pneumatic-tire roller.	110–130	20–40	200–300	Excellent	A—1.
	SP	Poorly graded sands and gravelly sands; little or no fines.	Fair to good	Poor to not suitable.	Reasonably stable; may be used in dike section having flat slopes.	Same	100–120	10–25	200–300	Excellent	A-1 or A-3.
	SM	Silty sands and sand-silt mixtures.	Fair to good	Same	Fairly stable; not particularly suited to shells, but may be used for impervious cores or dikes.	Good, but needs close control of moisture; use pneumatic-tire or sheepsfoot roller.	110–125	10–40	200–300	Fair to practically impervious.	A-1, A-2, or A-4.
	SC	Clayey sands and sand-clay mixtures.	Fair to good	Not suitable	Fairly stable; use as impervious core for flood-control structures.	Fair; use pneumatic-tire roller or sheepsfoot roller.	105–125	10–20	200–300	Poor to practically impervious.	A-2, A-4, or A-6.
Fine-grained soils (*more than 50 percent passing No. 200 sieve*).											
Silts and clays (*liquid limit of 50 or less*).	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, and clayey silts of slight plasticity.	Fair to poor	Not suitable	Poor stability; may be used for embankments if properly controlled.	Good to poor; close control of moisture is essential; use pneumatic-tire or sheepsfoot roller.	95–120	5–15	100–200	Fair to poor	A-4, A-5, or A-6.
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, and lean clays.	Fair to poor	Not suitable	Stable; use in impervious cores and blankets.	Fair to good; use pneumatic-tire or sheepsfoot roller.	95–120	5–15	100–200	Practically impervious.	A-4, A-6, or A-7.
	OL	Organic silts and organic clays having low plasticity.	Poor	Not suitable	Not suitable for embankments	Fair to poor; use sheepsfoot roller [4]	80–100	4–8	100–200	Poor	A-4, A-5, A-6, or A-7.

Silts and clays (*liquid limit greater than 50*).	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, and elastic silts.	Poor	Not suitable	Poor stability; use in core of hydraulic fill dam; not desirable in rolled fill construction.	Poor to very poor; use sheepsfoot roller.[4]	70-95	4-8	100-200	Fair to poor	A-5 or A-7
	CH	Inorganic clays having high plasticity and fat clays.	Poor to very poor.	Not suitable	Fair stability on flat slopes; use in thin cores, blankets, and dike sections of dams.	Fair to poor; use sheepsfoot roller.[4]	75-105	3-5	50-100	Practically impervious.	A-7.
	OH	Organic clays having medium to high plasticity and organic silts.	Same	Not suitable	Not suitable for embankments.	Poor to very poor; use sheepsfoot roller.[4]	65-100	3-5	50-100	Same	A-5 or A-7.
Highly organic soils:	Pt	Peat and other highly organic soils.	Not suitable	Not suitable	Not used in embankments, dams or subgrades for pavements					Fair to poor	None.

[1] Based on information in the Unified Soil Classification System (*11*). Ratings and ranges in test values are for guidance only. Design should be based on field survey and test of samples from construction site.

[2] Ratings are for subgrade and subbases for flexible pavement.

[3] Determined in accordance with test designation: T 99-49, A. A. S. H. O. (Part II) (*1*).

[4] Pneumatic-tire rollers may be advisable, particularly when moisture content is higher than optimum.

TABLE 12.—*Summary of principal characteristics of soils in De Soto County significant to engineering*

Soil map symbol	Soil name	Slopes	Drainage class	Depth to seasonally high water table	Soil material and type of deposit
		Percent		*Feet*	
Aa	Alligator clay, nearly level phase	½ to 2	Poor	0-1	Very plastic CH (A-7) alluvium in slack water areas.
Ab	Alluvial soils	0 to 20	Excessive to poor	0-5	SM to CH (A-2 to A-7) sediments in primarily wooded areas of the natural levees, depressions, and slack water areas. Frequently overflowed.
Ba	Beulah and Dundee soils, gently sloping phases.	5 to 8	Beulah: Somewhat excessive. Dundee: Moderately good.	2-5+	Undifferentiated Beulah and Dundee soils. Beulah: Mainly SM or ML (A-2 or A-4) sediments bordering former channels of Mississippi River. Dundee: Mainly CL to CH (A-6 or A-7) sediments of old natural levees of Mississippi River. Variations in these mapped areas include internal drainage ranging from somewhat excessive to poor and slopes from 2 to 20 percent.
	Bosket very fine sandy loam:				
Bc	Very gently sloping phase	2 to 5	Good	5+	1 to 2 feet of mainly ML or CL (A-4 or A-6) on SM or ML (A-2 or A-4) sediments of old natural levees. In places the material at depth of ½ to 2 feet may be MH or CH (A-7). Rarely overflowed.
Bb	Nearly level phase	½ to 2	Good	5+	
Bd	Brandon-Loring silt loams, strongly sloping phases.	12 to 17	Brandon: Good. Loring: Moderately good to good.	10+	Complex of Brandon and Loring soils bordering bottom lands of larger streams in Loess Hills; Brandon is predominant. Brandon: ½ to 1 foot of ML (A-4) on 1 to 2½ feet of mainly CL (A-6) derived from loess, over strata of GC, SC or CL (A-2, A-4 or A-6) Coastal Plain materials. See description of Loring soils below.
	Calhoun silt loam:				About ½ foot of ML (A-4) on about ½ foot of CL (A-6), over compact (fragipan) ML or CL (A-4 or A-6) that ranges in thickness from 1½ to 3 feet. Many small manganese concretions at all depths. Occupies stream terraces composed of material washed from loessal soils.
Ca	Nearly level phase	0 to 2	Poor	0	
Cb	Very gently sloping phase	2 to 5	Poor	0	
	Calloway silt loam:				
Cd	Eroded very gently sloping phase.	2 to 5	Somewhat poor	[1] 0	1 to 2 feet of ML or CL (A-4 or A-6) on 2 to 3 feet of compact (fragipan) ML or CL (A-6), over ML (A-4). Manganese concretions throughout the profile. These upland soils are derived from loess, which is underlain by Coastal Plain materials at depth of 5 to 10 feet.
Ce	Severely eroded gently sloping phase.	5 to 8	Somewhat poor	[1] 0	
Cc	Very gently sloping phase	2 to 5	Somewhat poor	[1] 0	
Cg	Collins silt loam	0 to 2	Moderately good to somewhat poor.	1-3	ML (A-4) alluvium washed from silty soils of the Loess Hills. In places the material at depth of 1½ to 3½ feet is CL (A-6).
Ch	Collins silty clay loam	0 to 2	Moderately good to somewhat poor.	1-3	Same as Collins silt loam except that upper 6 inches is CL (A-6).

See footnote at end of table.

TABLE 12.—*Summary of principal characteristics of soils in De Soto County significant to engineering*—Continued

Soil map symbol	Soil name	Slopes	Drainage class	Depth to seasonally high water table	Soil material and type of deposit
		Percent		*Feet*	
Ck	Collins silty clay loam, shallow phase.	0 to 2	Poor	1–3	Usually 1 to 2½ feet of CL (A–6) over MH or CH (A–7), on flood plains of small streams that flow from Loess Hills onto Mississippi Alluvial Plain.
Cf	Collins loamy sand, overwash phase.	0 to 2	Moderately good to somewhat poor.	0–3	Usually less than 1 foot of SM (A–2 or A–4) alluvium washed from Coastal Plain material, over ML (A–4) alluvium washed from loessal soils. Some small areas have more than 1 foot of sandy overwash, and soil is somewhat excessively drained.
Cl	Collins and Falaya silt loams, local alluvium phases.	0 to 2	Collins: Moderately good to somewhat poor. Falaya: Somewhat poor.	1–3	Undifferentiated Collins and Falaya soils that occur along and at the mouths of narrow drainageways, in upland depressions, and at the foot of slopes bordering the flood plains. See descriptions of these soils in this table.
Co	Commerce very fine sandy loam, nearly level phase.	½ to 2	Moderately good	1–2	Stratified materials ranging from SM to CL (A–2 to A–6) in natural levees of Mississippi River.
Cm	Commerce silt loam, very gently sloping phase.	2 to 5	Moderately good	1–2	
Cn	Commerce silty clay loam, nearly level phase.	½ to 2	Moderately good	1–2	
Da	Dowling clay	0 to 2	Poor	0–1	Highly plastic CH (A–7) alluvial materials in low, nearly level depressions in Mississippi Alluvial Plain.
Db	Dowling soils	0 to 2	Poor	0–1	1½ to 2½ feet of stratified ML to CH (A–4 to A–7) over CH (A–7), consisting of alluvium deposited by Mississippi River and local alluvium washed from other soils; occupy depressions of former stream channels or drainageways.
	Dubbs very fine sandy loam:				
Dd	Very gently sloping phase	2 to 5	Good	4+	Stratified materials ranging from SM to CH (A–4 to A–7) in old natural levees of Mississippi River.
De	Gently sloping phase	5 to 8	Good	4+	
Dc	Dubbs silt loam, very gently sloping phase.	2 to 5	Good	4+	
	Dundee silty clay loam:				
Dh	Nearly level phase	½ to 2	Moderately good	2–4	Stratified materials ranging from ML to CH (A–4 to A–7) in old natural levees of Mississippi River.
Dl	Gently sloping phase	5 to 8	Moderately good	2–4	
Dk	Very gently sloping phase	2 to 5	Moderately good	2–4	
	Dundee silt loam:				
Df	Nearly level phase	½ to 2	Moderately good	2–4	
Dg	Very gently sloping phase	2 to 5	Moderately good	2–4	
	Dundee very fine sandy loam:				
Dm	Nearly level phase	½ to 2	Moderately good	2–4	
Dn	Very gently sloping phase	2 to 5	Moderately good	2–4	
Fa	Falaya silt loam	½ to 2	Somewhat poor	1–3	Stratified materials ranging from ML to CH (A–4 to A–7), washed from loessal soils and deposited in flood plains of major streams in Loess Hills.
Fb	Falaya silty clay loam	½ to 2	Somewhat poor	1–3	
Fc	Falaya and Waverly silt loams, local alluvium phases.	½ to 2	Falaya: Somewhat poor. Waverly: Poor.	0	Stratified materials ranging from ML to CH (A–4 to A–7), washed from loessal soils and deposited in drainageways and depressions of the uplands and on the slopes bordering the flood plains.
Fd	Forestdale silty clay loam, nearly level phase.	½ to 2	Somewhat poor to poor	½–2	Stratified materials ranging from SM to CH (A–4 to A–7) at low elevation on old natural levees of Mississippi River.
	Grenada silt loam:				
Ga	Eroded very gently sloping phase.	2 to 5	Moderately good	[1] 1–2	½ to 1 foot of ML or CL (A–4 or A–6) on 1 to 2 feet of CL (A–6), over about 1½ feet of compact (fragipan) CL (A–6 or A–7); few manganese concretions below depth of about 1 foot. Upper layer may have been removed in severely eroded areas; few deep gullies in some areas. Soils are derived from loess, which is underlain by Coastal Plain materials at depths of 4 to 16 feet.
Gd	Severely eroded gently sloping phase.	5 to 8	Moderately good	[1] 1–2	
Gf	Severely eroded sloping phase	8 to 12	Moderately good	10+	
Gb	Severely eroded very gently sloping phase.	2 to 5	Moderately good	[1] 1–2	
Ge	Sloping phase	8 to 12	Moderately good	[1] 1–2	

Gg	Guin gravelly sandy loam, moderately steep phase.	17+	Excessive	10+	Stratified gravel, sand, and clay Coastal Plain materials that outcrop on steep slopes bordering the flood plains of larger streams in Loess Hills.
	Gullied land:				
Gh	Grenada soil material	5 to 20	Moderately good to good	10+	See description of Grenada and Loring soils in this table. Loessal material has been deeply eroded and gullied; underlying sandy or gravelly Coastal Plain materials are exposed in some gullies. Less eroded small included areas of Grenada soil have compact layer (fragipan) at depth of 1½ to 2½ feet.
Gk	Loring soil material	5 to 25	Moderately good to good	10+	
Ha	Henry silt loam	0 to 2	Poor	[1] 0	½ to 1 foot of ML or CL (A-4) on 1 to 1½ feet of compact (fragipan) ML or CL (A-4), over CL (A-6) loessal material, with numerous manganese concretions below depth of about 2½ feet. Soil developed in Loess Hills uplands.
Ka	Kershaw sand, moderately steep phase.	17+	Excessive	10+	About ½ foot of SM (A-2) over SM or SP (A-2 or A-3) Coastal Plain materials that outcrop on steep slopes that border the flood plain of Coldwater River.
La	Lexington-Loring-Providence silt loams, eroded moderately steep phases.	12 to 17	Good to moderately good	10+	Complex of Lexington, Loring, and Providence soils in Loess Hills. Lexington and Providence soils have 1½ to 3½ feet of ML or CL (A-4 or A-6) derived from loess, on stratified SM and SP (A-2 and A-3) Coastal Plain materials; some substrata of Providence soil may be gravelly. Providence soils have compact layer (fragipan) at depth of 2 to 3 feet. See description of Loring soils in this table.
Lb	Lintonia silt loam, eroded very gently sloping phase.	2 to 5	Good	5+	Stratified materials in terraces, mainly ML and CL (A-4, A-6, and A-7), that have washed from loessal soils.
	Loring silt loam:				
Lc	Eroded very gently sloping phase.	2 to 5	Moderately good to good	5+	ML or CL (A-4, A-6, or A-7), with 1 to 2 feet of slightly compact (fragipan) CL (A-7) at depth of 2 to 3 feet, derived from loess; manganese concretions at depth below 2½ feet. In places, stratified Coastal Plain materials occur at depth of about 5 or 6 feet. These soils have developed in Loess Hills uplands. Gullies in severely eroded areas.
Lg	Eroded strongly sloping phase	12 to 17	Moderately good to good	10+	
Ld	Gently sloping phase	5 to 8	Moderately good to good	5+	
Lh	Moderately steep phase	17+	Moderately good to good	10+	
Le	Sloping phase	8 to 12	Moderately good to good	5+	
Lf	Strongly sloping phase	12 to 17	Moderately good to good	10+	
	Loring silty clay loam:				
Lk	Severely eroded very gently sloping phase.	2 to 5	Moderately good to good	5+	
Ll	Severely eroded gently sloping phase.	5 to 8	Moderately good to good	5+	
Lm	Severely eroded sloping phase	8 to 12	Moderately good to good	5+	
Ln	Severely eroded strongly sloping phase.	12 to 17	Moderately good to good	10+	
	Memphis silt loam:				
Ma	Eroded very gently sloping phase.	2 to 5	Good	5+	ML or CL (A-4, A-6, or A-7), that may be alkaline below depth of about 8 feet; developed in deep loess of uplands. Few gullies in severely eroded steeper slope phases.
Mb	Eroded gently sloping phase	5 to 8	Good	5+	
Me	Eroded moderately steep phase.	17+	Good	10+	
Mc	Eroded sloping phase	8 to 12	Good	5+	
Md	Eroded strongly sloping phase	12 to 17	Good	10+	
	Memphis silty clay loam:				
Mg	Severely eroded gently sloping phase.	5 to 8	Good	10+	
Ml	Severely eroded moderately steep phase.	17+	Good	10+	
Mh	Severely eroded sloping phase	8 to 12	Good	10+	
Mk	Severely eroded strongly sloping phase.	12 to 17	Good	10+	
Mf	Severely eroded very gently sloping phase.	2 to 5	Good	10+	

See footnote at end of table.

TABLE 12.—*Summary of principal characteristics of soils in De Soto County significant to engineering*—Continued

Soil map symbol	Soil name	Slopes	Drainage class	Depth to seasonally high water table	Soil material and type of deposit
		Percent		*Feet*	
Mm	Mhoon silty clay, nearly level phase.	½ to 2	Somewhat poor	½–2	Stratified CL or CH (A–6 or A–7) materials occupying lower part of natural levees of Mississippi River.
Na	Natchez silt loam, steep phase	17+	Somewhat excessive	10+	ML or CL (A–4, A–6, or A–7), developed in loess in a narrow band on the bluffs bordering the Mississippi Alluvial Plain.
	Olivier silt loam:				
Ob	Eroded very gently sloping phase.	2 to 5	Somewhat poor	[1] 0–1	Stratified ML and CL (A–4 or A–6) materials in terraces; washed from loessal soils. May have a compact layer (fragipan), 1½ to 3 feet thick, at depth of 15 to 24 inches. Manganese concretions at depths below a few inches. Stratified Coastal Plain materials occur at depth of 6 to 12 feet. Some gullies in severely eroded phase.
Oa	Nearly level phase	½ to 2	Somewhat poor	[1] 0–1	
Oc	Severely eroded gently sloping phase.	5 to 8	Somewhat poor	[1] 0–1	
	Richland silt loam:				
Ra	Very gently sloping phase	2 to 5	Moderately good	[1] 1½–2	Stratified ML and CL (A–4 and A–6) materials in terraces; washed from loessal soils. Compact layer (fragipan), 1 to 2 feet thick, at depth of 2 to 3 feet. Manganese concretions at depths below about 1 foot. Stratified materials occur at depths below 4 to 10 feet. Few gullies in some areas.
Rb	Eroded very gently sloping phase.	2 to 5	Moderately good	[1] 1½–2	
Rd	Severely eroded gently sloping phase.	5 to 8	Moderately good	[1] 1½–2	
Re	Severely eroded sloping phase	8 to 12	Moderately good	[1] 1½–2	
Rc	Severely eroded very gently sloping phase.	2 to 5	Moderately good	[1] 1½–2	
Rf	Robinsonville very fine sandy loam, nearly level phase.	½ to 2	Good	2–4	Stratified SM and ML (A–2 and A–4) in recent deposits of natural levee or first bottoms. Located mainly between flood-control levee and Mississippi River, hence is occasionally overflowed.
	Sharkey clay:				
Sa	Nearly level phase	½ to 2	Poor	0–1	Very plastic CH (A–7) alluvium in slack water areas of Mississippi Alluvial Plain; subject to local flooding during wet winter season.
Sb	Level phase	0 to ½	Poor	0–1	
Sc	Sharkey very fine sandy loam, very gently sloping overwash phase.	2 to 5	Poor	0–1	½ to 1 foot of SM or ML (A–2 or A–4) on very plastic CH (A–7) alluvium in narrow slack-water areas at foot of sandy or silty slopes.
Va	Vicksburg silt loam	0 to 2	Good	1–3	ML (A–4) alluvium recently washed from silty soils of the Loess Hills. Some areas may be flooded during winter.
Vb	Vicksburg and Collins silt loams, local alluvium phases.	2 to 5	Moderately good to good.	1–3	See separate descriptions of Collins and Vicksburg soils in this table. Occupies long narrow areas adjacent to drainageways, upland depressions, and toe slopes between uplands and bottom lands.
Wa	Waverly silty clay loam	0 to 2	Poor	0	Stratified CL and CH (A–6 and A–7) alluvium washed from loessal soils and deposited in slack-water areas on flood plains of Camp Creek and Coldwater River.

[1] Perched water table.

TABLE 13.—*Estimated physical and chemical properties of soils based on interpretations of soil survey data*

Soil type	Depth from ground surface in a typical profile	Classification: Unified	Classification: A. A. S. H. O.	Permeability	Structure	Available moisture-holding capacity	pH	Shrink-swell potential	Suitability as topsoil
	Inches			*Inches of water per hour*		*Inches of water per foot of soil*			
Alligator clay	0 to 4	CH	A-7	[1]	Granular	3.0	5.6-6.0	Very high	Unsuitable.
	4 to 24	CH	A-7	[1]	Massive	3.0	5.6-6.0	Very high	Unsuitable.
	24 to 40+	CH	A-7	[1]	Massive	3.0	5.6-6.0	Very high	Unsuitable.
Alluvial soils [2]									
Beulah very fine sandy loam	6 to 28	SM or ML	A-2 or A-4	0.8-2.5	Structureless	1.2	5.6-6.5	Low	Good.
	28 to 42	SM	A-2	5.0-10+	Structureless	1.0	6.1-6.5	Low	Good.
Bosket very fine sandy loam	0 to 6	SM or ML	A-2 or A-4	.8-2.5	Weak crumb	1.6	6.1-6.5	Low	Good.
	6 to 18	SC or CL	A-4 or A-6	.8-2.5	Weak blocky	1.6	6.1-6.5	Moderate	Good to fair.
	18 to 42	SM or ML	A-2 or A-4	.8-2.5	Structureless	1.4	6.1-6.5	Low	Good.
Brandon silt loam	0 to 8	ML or CL	A-4	.8-2.5	Granular	1.4	5.1-5.5	Low	Poor.
	8 to 25	CL	A-6 or A-7	.8-2.5	Granular	1.7	5.1-5.5	Moderate	Poor.
	25+	GC or CL	A-2, A-4, or A-6.	5-10	Structureless	.7	5.1-5.5	Low to moderate	Fair to good.
Calhoun silt loam	0 to 6	ML	A-4	.8-2.5	Granular	1.4	5.1-5.5	Low	Poor.
	6 to 12	CL	A-6	.2-.8	Medium to fine blocky.	1.0	5.1-5.5	Moderate	Poor.
	12 to 48	ML or CL	A-4 or A-6	[1]	Medium blocky		5.1-5.5	Moderate	Poor.
Calloway silt loam	0 to 5	ML or CL	A-4	.8-2.5	Granular	1.4	5.1-5.5	Low	Poor.
	5 to 14	CL	A-6 or A-7	.2-.8	Medium to fine blocky.	1.2	5.1-5.5	Moderate	Poor.
	14 to 42	CL	A-6 or A-7	[1]	Massive		5.1-5.5	Moderate	Poor to unsuitable.
	42+	ML or CL	A-4 or A-6	.2-2.5	Structureless		5.1-5.5	Low	Poor.
Collins silt loam	0 to 6	ML or CL	A-4	.8-2.5	Granular	1.5	5.6-6.0	Low	Fair to good.
	6 to 18	ML or CL	A-4	.8-2.5	Granular	1.5	5.6-6.0	Low	Fair to good.
	18 to 42	ML or CL	A-4	.8-2.5	Structureless	1.4	5.6-6.0	Low	Fair.
Commerce very fine sandy loam.	0 to 8	SM or ML	A-2 or A-4	.8-2.5	Weak crumb	2.0	6.6-7.3	Low	Fair to good.
	8 to 28	ML or CL	A-4	.8-2.5	Structureless	2.2	7.4-7.8	Low	Fair to good.
	28 to 32	SM or ML	A-2 or A-4	.8-2.5	Structureless	2.2	7.4-7.8	Low	Fair.
	32 to 42+	ML or CL	A-4	.8-2.5	Structureless	2.2	7.4-7.8	Low	Fair.
Dowling clay	0 to 4	CH	A-7	.05-.2	Granular	2.5	6.1-7.3	Very high	Unsuitable.
	4 to 26	CH	A-7	[1]	Blocky	3.0	6.1-7.3	Very high	Unsuitable.
	26 to 42	CH	A-7	[1]	Massive	3.0	6.1-7.3	Very high	Unsuitable.
Dowling soils	0 to 5	ML to CH	A-4 to A-7	.05-.2	Granular	2.5		Moderate to very high.	Unsuitable.
	5 to 24	ML to CH	A-4 to A-7	[1]	Blocky to massive	3.0		Same	Unsuitable.
	24 to 42+	CH	A-7	[1]	Massive	3.0		Very high	Unsuitable.
Dubbs very fine sandy loam	0 to 6	SM or ML	A-4	.8-2.5	Weak crumb	1.8	6.1-6.5	Low	Fair to good.
	6 to 24	CL or CH	A-6 or A-7	.2-.8	Subangular blocky	1.8	6.1-6.5	Moderate to high.	Poor.
	24 to 42+	SM or ML	A-4	.8-2.5	Single grain	1.5	6.1-6.5	Low	Fair.
Dundee silty clay loam	0 to 6	CL	A-6 or A-7	.2-.8	Weak crumb to granular.	2.0	5.1-6.0	Moderate	Poor.
	6 to 17	MH or CH	A-7	.05-.2	Subangular blocky	2.2	5.1-5.5	High	Poor to unsuitable.
	17 to 26	CL or CH	A-6 or A-7	.2-.8	Subangular blocky	2.0	5.1-5.5	Moderate to high.	Poor.
	26 to 40+	ML or CL	A-4 or A-6	.8-2.5	Structureless	2.0	5.1-5.5	Moderate	Poor to fair.

See footnotes at end of table.

TABLE 13.—*Estimated physical and chemical properties of soils based on interpretations of soil survey data*—Continued

Soil type	Depth from ground surface in a typical profile	Classification: Unified	Classification: A. A. S. H. O.	Permeability	Structure	Available moisture-holding capacity	pH	Shrink-swell potential	Suitability as topsoil
	Inches			*Inches of water per hour*		*Inches of water per foot of soil*			
Falaya silt loam	0 to 10	ML or CL	A-4	0. 8-2. 5	Structureless	1. 5	5. 6-6. 0	Low	Fair to good.
	10 to 18	CL	A-6	. 8-2. 5	Massive to weak crumb.	1. 4	5. 1-5. 5	Moderate	Fair.
	18 to 40+	CL	A-6	. 8-2. 5	Massive	1. 4	5. 1-5. 5	Moderate	Fair.
Forestdale silty clay loam	0 to 6	CL	A-6 or A-7	. 2-. 8	Weak crumb	1. 7	5. 1-6. 0	Moderate	Poor.
	6 to 30	CL or CH	A-7	. 05-. 2	Subangular blocky	1. 6	5. 1-5. 5	Moderate to high.	Poor to unsuitable.
	30 to 42	SM, SC, or ML.	A-4 or A-6	. 2-. 8	Structureless	1. 7	5. 1-5. 5	Low to moderate.	Poor to unsuitable.
Grenada silt loam	0 to 9	ML or CL	A-4 or A-6	. 8-2. 5	Blocky	1. 5	5. 1-5. 5	Low to moderate.	Poor.
	9 to 24	CL	A-6 or A-7	. 8-2. 5	Blocky	1. 8	5. 1-5. 5	Moderate	Poor.
	24 to 42	CL	A-6 or A-7	. 05-. 2	Structureless	. 7	5. 1-5. 5	Moderate	Poor to unsuitable.
Guin gravelly sandy loam	0 to 9	GM or SM	A-2 or A-4	5-10	Structureless	. 7	4. 5-5. 0	Low to none	Good.
	9 to 24	GC	A-2	5-10	Structureless	. 8	4. 5-5. 0	Low	Good.
	24 to 53	SC or CL	A-4 or A-6	5-10	Weak subangular blocky.	. 7	4. 5-5. 0	Low to moderate.	Fair to good.
	53+	GC	A-2	5-10	Structureless	. 8	4. 5-5. 0	Low	Fair to good.
Henry silt loam	0 to 8	ML or CL	A-4	. 8-2. 5	Granular	1. 4	5. 1-5. 5	Low	Poor.
	8 to 28	ML or CL	A-4	. 2-. 8	Granular	1. 0	5. 1-5. 5	Low	Poor.
	28 to 42+	CL	A-6 or A-7	(1)	Blocky to massive		5. 1-5. 5	Moderate	Poor to unsuitable.
Kershaw sand	0 to 6	SM	A-2	5-10	Single grain	. 7	5. 6-6. 0	Low to none	Good to fair.
	6 to 24	SM or SP	A-2 or A-3	5-10	Single grain	. 8	5. 1-5. 5	None	Fair to poor.
	24 to 42+	SM or SP	A-2 or A-3	5-10	Single grain	. 7	4. 5-5. 0	None	Fair to poor.
Lexington silt loam	0 to 4	ML or CL	A-4	. 8-2. 5	Granular	1. 4	5. 1-6. 0	Low	Poor.
	4 to 24	CL	A-6	. 8-2. 5	Granular	1. 7	5. 1-5. 5	Moderate	Poor.
	24 to 46	SC or CL	A-4 or A-6	. 8-2. 5	Subangular blocky	1. 8	5. 1-5. 5	Low to moderate.	Fair to good.
	46+	SM or SP	A-2 or A-3	2. 5-5. 0	Structureless	. 7		Low to none	Fair to good.
Lintonia silt loam	0 to 11	ML or CL	A-4	. 8-2. 5	Granular to blocky	1. 4	5. 6-6. 0	Low	Poor.
	11 to 30	CL	A-6 or A-7	. 8-2. 5	Blocky	1. 7	5. 6-6. 0	Moderate	Poor.
	30 to 42+	ML or CL	A-6	. 8-2. 5	Blocky	1. 8	5. 6-6. 0	Moderate	Poor.
Loring silt loam	0 to 5	ML or CL	A-4	. 8-2. 5	Granular	1. 4	5. 6-6. 0	Low	Poor.
	5 to 32	ML or CL	A-6 or A-7	. 8-2. 5	Blocky	1. 7	5. 1-5. 5	Moderate	Poor.
	32 to 48	CL	A-7	. 8-2. 5	Blocky	1. 7	5. 1-5. 5	Moderate	Poor to unsuitable.
Memphis silt loam	0 to 5	ML	A-4	. 8-2. 5	Weak crumb	1. 4	5. 1-5. 5	Low	Poor.
	5 to 24	ML or CL	A-6 or A-7	. 8-2. 5	Blocky	1. 7	5. 1-5. 5	Moderate	Poor.
	24 to 50	ML or CL	A-6	. 8-2. 5	Blocky	1. 7	5. 1-5. 5	Moderate	Poor.
	50 to 112	ML or CL	A-4 or A-6	. 8-2. 5	Massive	1. 4	5. 6-7. 8	Low	Poor.
Mhoon silty clay	0 to 4	CL or MH	A-6 or A-7	. 05-. 2	Granular	2. 5	6. 6-7. 3	Moderate to high	Unsuitable.
	4 to 18	MH or CH	A-7	. 05-. 2	Blocky	2. 5	6. 6-7. 8	High	Unsuitable.
	18 to 32	CL or CH	A-6 or A-7	. 8-2. 5	Structureless	2. 5	6. 6-7. 8	Moderate to high	Unsuitable.
	32 to 42	CL, CH, or MH.	A-6 or A-7	. 8-2. 5	Structureless	2. 5	7. 4-7. 8	Moderate to high	Unsuitable.
Natchez silt loam	0 to 10	ML or CL	A-4	. 8-2. 5	Granular to blocky	1. 4	5. 6-6. 5	Low	Poor.
	10 to 30	ML or CL	A-6 or A-7	. 8-2. 5	Blocky	1. 4	6. 1-6. 5	Low to moderate.	Poor.
	30 to 46+	ML or CL	A-4 or A-6	. 8-2. 5	Structureless	1. 4	6. 1-8. 4	Low	Poor.

Olivier silt loam	0 to 4	ML or CL	A-4	.8-2.5	Blocky	1.4	5.1-5.5	Low	Poor.
	4 to 20	ML or CL	A-4 or A-6	.8-2.5	Blocky	1.2	5.1-5.5	Low to moderate.	Poor.
	20 to 48	CL	A-6 or A-7	.05-.2	Structureless		5.1-5.5	Moderate	Poor.
	48+	ML or CL	A-4 or A-6	.8-2.5	Structureless		5.1-5.5	Low to moderate.	Poor.
Providence silt loam	0 to 8	ML or CL	A-4	.8-2.5	Granular	1.5	5.1-5.5	Low	Poor.
	8 to 24	CL	A-6 or A-7	.8-2.5	Granular	1.8	5.1-5.5	Moderate	Poor.
	24 to 42	SC or CL	A-6	.05-.2	Structureless	.7	5.1-5.5	Moderate	Poor.
	42+	GM, SM, SC, or CL.	A-2, A-4, or A-6.	2.5-5.0	Structureless		5.1-5.5	Low to moderate.	Fair to good.
Richland silt loam	0 to 6	ML or CL	A-4	.8-2.5	Weak crumb	1.4	5.1-5.5	Low	Poor.
	6 to 24	ML or CL	A-6	.8-2.5	Blocky	1.8	5.1-5.5	Moderate	Poor.
	24 to 42	ML or CL	A-4 or A-6	.05-.2	Structureless	.7	5.1-5.5	Low to moderate.	Poor.
	42+	ML or CL	A-4 or A-6		Structureless		5.1-5.5	Low to moderate.	Poor.
Robinsonville very fine sandy loam.	0 to 8	SM or ML	A-2 or A-4	.8-2.5	Weak granular	1.6	6.6-7.8	Low	Fair to good.
	8 to 32	SM or ML	A-2 or A-4	.8-2.5	Structureless	1.6	6.6-7.8	Low	Fair to good.
	32 to 42+	SM	A-2	5-10+	Structureless	1.0	6.6-7.8	Low to none	Good.
Sharkey clay	0 to 4	CH	A-7	(1)	Fine granular	3.0	6.1-7.3	Very high	Unsuitable.
	4 to 24	CH	A-7	(1)	Massive or blocky	3.0	6.1-7.3	Very high	Unsuitable.
	24 to 42+	CH	A-7	(1)	Massive or blocky	3.0	6.1-7.3	Very high	Unsuitable.
Vicksburg silt loam	0 to 8	ML	A-4	.8-2.5	Structureless	1.5	5.6-6.0	Low	Fair to good.
	8 to 32	ML	A-4	.8-2.5	Structureless	1.4	5.6-6.0	Low	Fair to good.
	32 to 50	ML	A-4	.8-2.5	Structureless	1.4	5.6-6.0	Low	Fair to good.
Waverly silty clay loam	0 to 8	CL or CH	A-6 or A-7	.05-.2	Structureless	1.5	5.1-5.5	High	Unsuitable.
	8 to 42+	CL or CH	A-6 or A-7	.2-.8	Structureless	1.3	5.1-5.5	High	Unsuitable.

[1] Less than 0.05. [2] Unclassified materials.

TABLE 14.—*Highway soil engineering features*

Soil series	Suitability for earthwork during winter and early spring	Desirable location of grade line
Alligator	Not suited	In flooded areas not less than 4 feet above high water mark; in areas not flooded not less than 4 feet above water table.
Alluvial soils	Not suited	Same.
Beulah	Poor to fair (limited by water table).	Not less than 4 feet above water table.
Bosket	Poor to fair	Same.
Brandon	Fair to poor	Anywhere.
Calhoun	Not adaptable	Not less than 4 feet above water table.
Calloway	Not adaptable	Anywhere, if adequate subdrainage is provided.
Collins	Poor to not adaptable (limited by water table).	Not less than 4 feet above water table.
Commerce	Poor to fair (limited by water table).	Same.
Dowling	Not adaptable	In flooded areas not less than 4 feet above high water mark; in areas not flooded not less than 4 feet above water table.
Dubbs	Poor to not adaptable.	Not less than 4 feet above water table.
Dundee	Poor to not adaptable.	Same.
Falaya	Not adaptable	Same.
Forestdale	Not adaptable	Same.
Grenada	Poor to not adaptable.	Anywhere, if adequate subdrainage is provided.
Guin	Fair to good	Anywhere.
Henry	Poor to not adaptable.	Anywhere, if adequate subdrainage is provided.
Kershaw	Good	Anywhere.
Lexington	Fair to poor	Anywhere.
Lintonia	Not adaptable	Not less than 4 feet above water table.
Loring	Poor to not adaptable.	Anywhere, if adequate subdrainage is provided.
Memphis	Poor to not adaptable.	Anywhere.
Mhoon	Not adaptable	Not less than 4 feet above water table.
Natchez	Poor to not adaptable.	Anywhere.
Olivier	Poor to not adaptable.	Anywhere, if adequate subdrainage is provided.
Providence	Fair to poor	Same.
Richland	Poor to not adaptable.	Same.
Robinsonville	Poor to fair (limited by water table).	Above high water.
Sharkey	Not adaptable	Not less than 4 feet above water table.
Vicksburg	Poor to not adaptable (limited by water table).	Above high water mark.
Waverly	Not adaptable	Above high water mark.

Many soils have ponded water or a shallow water table for significant periods each year. Roads on these soils must be constructed on embankment sections or provided with an adequate system of underdrains and surface drains. In lowlands and other areas that are flooded, roads should be constructed on a continuous embankment that is several feet above the level of frequent floods.

The Calloway, Grenada, Henry, Loring, and Olivier soils have a compact layer (fragipan) at slight depth that impedes vertical drainage and results in a perched water table. Both factors should be considered in the roadway design. In nearly level areas, side ditches of roads should extend below the fragipan. The pavement grade should be at least 4 feet above the top of the fragipan. In steeper areas road cuts normally extend below the fragipan depth, but adequate underdrainage must be provided where the construction changes from a cut section to a fill section. This can be accomplished by excavating the fragipan and replacing it with a more permeable material. A similar problem is caused by the very plastic stratum of Coastal Plain material of the Brandon, Guin, Lexington, and Providence soils, and the same construction procedure should be used.

Loessal materials are very susceptible to water erosion when runoff is concentrated; consequently, gutters and ditches need sodding, paving, or check dams to prevent excessive erosion.

Loess is less likely to slump on back slopes of road cuts that are nearly vertical. However, it is more subject to erosion and slumping when the back slopes are less steep. When deep road cuts are made in loess, the back slopes should be benched at vertical intervals of 10 to 20 feet. To minimize erosion and slumping, a paved gutter should be built near the edge of each bench.

Loess has its structure changed when moved. Consequently, to prevent slide or slump, the slopes of road fills made of loess must be less steep than those of road cuts made in undisturbed loess. High fills should be benched and protected from erosion.

The Alligator, Dowling, and Sharkey clays shrink greatly on drying, and they swell on wetting. If subgrades made of these soils are too wet when the pavement is constructed, subsequent drying will shrink the soil under the edges of the pavement and may cause longitudinal cracks. If subgrades are too dry, absorption of moisture swells the soil and causes the pavement to warp. The cracking and warping of pavements laid over plastic soils can be minimized if a thick layer of soil material that has a low-volume change is used as a foundation course beneath the pavement. The foundation course should extend through the road shoulder to provide adequate drainage.

Roadway designs in which the shoulders are wide and the slopes are less steep than normal tend to prevent excessive volume change in the material beneath the pavement. The shrinking and swelling of subgrade materials can also be controlled by compacting the materials to maximum density at or slightly above the optimum moisture content, as determined in the American Association of State Highway Officials compaction test.

It is generally believed that repeated movements of heavy-axle trucks on a rigid pavement constructed on a subgrade composed of a soil material of which more than 35 percent passes the No. 200 sieve (0.074 mm. openings) will cause the forceful ejection of the subgrade soil and water through the joints and at the edge of the pavement. The Alligator, Dowling, and Sharkey clays are most subject to pumping action. This action, however, may also occur on other soils, particularly where the undrained

fragipan of loessal soils is only a slight depth below the pavement. These soils should be covered with a porous sand-gravel base course to prevent the pumping action.

The gravelly strata of Coastal Plain deposits of the Brandon, Guin, and Providence soils are possible sources of material for use in subbase and base courses of pavements, and the material may be used as surfacing for county roads. These Coastal Plain strata normally contain chert and other deleterious materials. Consequently, the sand and gravel in these strata may not be suitable for use in concrete structures or for the surface course of a flexible pavement.

Detailed Soil Investigations for Earth Construction

At many construction sites, major variations in the soil may occur within the depth of the proposed excavation, and several soil units may occur within a short distance. The soil map and profile descriptions, as well as the engineering data and recommendations given in this section, should be used in planning detailed surveys of soils at construction sites. By using the information in the soil survey reports, the soils engineer can concentrate on the most important soil units. Then, a minimum number of soil samples will be obtained for laboratory testing, and an adequate soil investigation can be made at minimum cost.

Glossary[4]

Acidity. The degree of acidity of the soil mass expressed in pH values, or in words, as follows:

	pH		*pH*
Extremely acid	below 4.5	Mildly alkaline	7.4–7.8
Very strongly acid	4.5–5.0	Moderately alkaline	7.9–8.4
Strongly acid	5.1–5.5	Strongly alkaline	8.5–9.0
Medium acid	5.6–6.0	Very strongly alkaline.	9.1 and higher.
Slightly acid	6.1–6.5		
Neutral	6.6–7.3		

Alluvium. Fine material such as sand, silt, or clay, deposited on land by streams.

Clay. Small mineral soil grains, less than 0.002 mm. in diameter.

Colluvium. Deposits of rock fragments and soil material accumulated at the base of slopes through the influence of gravity; includes creep and local wash.

Concretions. Local concentrations of chemical compounds, such as calcium carbonate or compounds of magnesium or iron, that form hard grains or nodules of mixed composition and of various sizes, shapes, and colors.

Consistence. Degree of cohesion and resistance to forces tending to deform or rupture the aggregate. The relative mutual attraction of the particles in the whole mass, or their resistance to separation. The following terms are commonly used to describe consistence.

Brittle.—Breaking with a sharp, clean fracture when dry, or shattering into cleanly broken hard fragments if struck a sharp blow.

Claypan.—Compact horizons or layers rich in clay and separated more or less abruptly from the overlying horizon; hard when dry and plastic or stiff when wet.

Compact.—Dense and firm but without any cementation.

Firm.—Resistant to forces tending to produce rupture or deformation.

Friable.—Easily crumbled by the fingers; nonplastic.

Impervious.—Very resistant to penetration by water and usually by air and plant roots; impenetrable.

Plastic.—Readily molded or modeled without rupture; puttylike.

[4] Most of the definitions in this glossary were taken from Soils and Men (*8*) or from the Soil Survey Manual (*9*).

Sticky.—Adhesive when wet, but cohesive when dry; shows tendency to adhere to other material and objects.

Stiff.—Resistant to deformation or rupture; firm and tenacious and tending toward imperviousness. Usually applied to conditions of the soil in place and moderately wet.

Tight.—Compact, impervious, tenacious, and usually plastic.

Contour tillage. Furrows plowed at right angles to the direction of slope, at the same level throughout, and ordinarily at comparatively close intervals.

Cropland. Land regularly used for crops, except forest crops. It includes rotation pasture, cultivated summer fallow, or other land ordinarily used for crops but temporarily idle.

Crumb. Generally soft, small, porous aggregates, irregular but tending toward a spherical shape, as in the A_1 horizons of many soils. Crumb structure is closely related to granular structure.

Erosion. The wearing away or removal of soil material by water or wind.

Forest. Land not in farms that bears a stand of trees of any age or stature, including seedlings (reproductions), but of species attaining a minimum average height of 6 feet at maturity, or land from which such a stand has been removed, but is not now restocking, and on which no other use has been substituted. Forest on farms is called farm woodland or farm forest.

Fertility. The inherent qualities that enable a soil to sustain plant growth.

First bottom. The normal flood plain of a stream; land along a stream that is subject to overflow.

Fragipans. Very compact horizons, rich in silt, sand, or both and usually relatively low in clay. They commonly interfere with water and root penetration.

Genesis, soil. Mode of origin of the soil, referring particularly to the processes responsible for the development of the solum from the unconsolidated parent material.

Granular. Roughly spherical, firm, small aggregates that may be either hard or soft but that are usually more firm than crumb; without the distinct faces of blocky structure.

Great soil group. A broad group of soils having common internal soil characteristics. It includes one or more families of soils.

Green manure crop. Any crop grown and plowed under for the purpose of improving the soil, especially by the addition of organic matter.

Hardpan. An indurated (hardened) or cemented soil horizon. The soil may have any texture and is compacted or cemented by iron oxide, organic material, silica, calcium carbonate, or other substances.

Horizon, soil. A layer of soil, approximately parallel to the soil surface, and having characteristics produced by soil-forming processes.

Horizon A.—The upper layer of the soil mass, from which material has been removed by percolating water; the eluviated part of the solum; the surface soil. It is generally divided into two or more subhorizons; A_0, which is not a part of the mineral soil, but the accumulations of organic debris on the surface; and the other subhorizons designated as A_1, A_2, and so on.

Horizon B.—The layer of deposition, to which materials have been added by percolating water; the illuviated part of the solum; the subsoil. This horizon may also be divided into several subhorizons, depending on color, structure, consistence, or the character of the material deposited, and designated as B_1, B_2, B_3, and so on.

Horizon C.—The layer of partly weathered material underlying the B horizon; the substratum; usually part of the parent material.

Horizon D.—Any stratum underlying the C, or the B if no C is present, which is unlike C, or unlike the material from which the solum has been formed.

Humus. The well-decomposed, more or less stable part of the organic matter of the soil.

Internal drainage. Downward flow of excess water through the soil. It is affected by the texture and structure, by other characteristics of the soil and underlying layers, and by the height of the water table, either permanent or perched. Relative terms for expressing internal drainage are: Very rapid, rapid, medium, slow, very slow, and none.

Leaching, soil. Downward movement of materials in solution.

Massive. Large uniform masses of cohesive soil, sometimes with ill-defined and irregular cleavage, as in some of the fine-textured alluvial soils; structureless.

Morphology. The physical constitution of the soil, including the texture, structure, porosity, consistence, and color of the various

soil horizons, their thickness, and their arrangement in the soil profile.

Mottling. Containing irregular spots of different colors (*5*).

Natural drainage. Conditions that existed during the development of the soil; opposed to altered drainage, which is usually the result of artificial drainage or irrigation but may be due to natural deepening of channels or filling of depressions. The following terms are used to express natural drainage: Excessively drained, somewhat excessively drained, well drained, moderately well drained, imperfectly or somewhat poorly drained, poorly drained, and very poorly drained.

Normal soil. A soil having a profile in equilibrium or nearly in equilibrium with its environment, developed under a good but not excessive drainage from parent material of mixed mineralogical, physical, and chemical composition, and expressing the full effects of the forces of climate and living matter.

Nutrients, plant. The elements taken in by the plant, essential to its growth, and used by it in the elaboration of its food and tissue. These include nitrogen, phosphorus, calcium, potassium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps others obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Parent material. The unconsolidated mass from which the soil profile develops.

Permeable. Easily penetrated by water.

Productivity. The capability of a soil to produce a specified plant or sequence of plants under a system of management. A response to management.

Profile, soil. A vertical section from the surface into the parent material.

Relief. The elevations or inequalities of a land surface, considered collectively.

Runoff. Water removed by flow over the surface of the soil; amount and rapidity of runoff are affected by texture, structure, and porosity of the surface soil, climate, cover, and slope. Relative degree of runoff is expressed by the terms very rapid, rapid, medium, slow, very slow, and ponded.

Sand. Small rock or mineral fragments ranging in diameter from 0.05 mm. to 2.0 mm. The term sand is also applied to soils containing 90 percent or more of sand.

Silt. Small grains of mineral soil ranging in diameter from 0.002 mm. to 0.05 mm.

Single grain. Each grain taken alone, as in sand; structureless.

Soil. The natural medium for the growth of land plants on the surface of the earth; composed of organic and mineral materials.

Structure, soil. The aggregation of primary soil particles into compound particles or clusters of primary particles, which are separated from adjoining aggregates by surface of weakness.

Subsoil. Technically, the B horizon; roughly, that part of the profile below plow depth.

Substratum. Material underlying the subsoil.

Surface soil. Technically, the A horizon; commonly, the part of the upper profile usually stirred by plowing.

Terrace (geologic). An old alluvial plain, usually level or smooth, bordering a stream, a lake, or the sea; frequently called second bottoms, as contrasted to flood plains; seldom subject to overflow.

Texture. Size of the individual particles making up the soil mass; the proportions of sand, silt, and clay particles less than 2 millimeters in diameter. A coarse-textured soil is one high in content of sand; a fine-textured one has a large proportion of clay.

Upland (geologic). Land consisting of material unworked by water in recent geologic time and lying in general at higher elevations than the alluvial plain or stream terrace.

Literature Cited

(1) American Association of State Highway Officials.
1955. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 7, 2 v. Washington, D. C.

(2) Marbut, C. F.
1935. SOILS OF THE UNITED STATES. U. S. Dept. Agr. Atlas of Amer. Agr., pt. 3, Advance Sheets, No. 8, 98 pp., illus.

(3) Mississippi Historical Records.
1941. INVENTORY OF THE COUNTY ARCHIVES OF MISSISSIPPI, TUNICA COUNTY, MISS. Miss. Hist. Rec. 72: 81–94.

(4) Oakes, H., and Thorp, J.
1950. DARK CLAY SOILS OF WARM REGIONS, VARIOUSLY CALLED RENDZINA, BLACK COTTON SOIL, REGUR, AND TIRS. Soil Sci. Soc. Amer. Proc. 15: 348–354.

(5) Simonson, R. W.
1951. DESCRIPTION OF MOTTLING IN SOILS. Soil Sci. 71: 187–192, illus.

(6) ———
1956. GENESIS, MORPHOLOGY, AND CLASSIFICATION OF SOILS. *In* Soil Survey of Tunica County, Mississippi, U. S. Dept. Agr., Soil Conserv. Serv. Soil Survey Rpt., Ser. 1942, No. 14, 86 pp., illus.

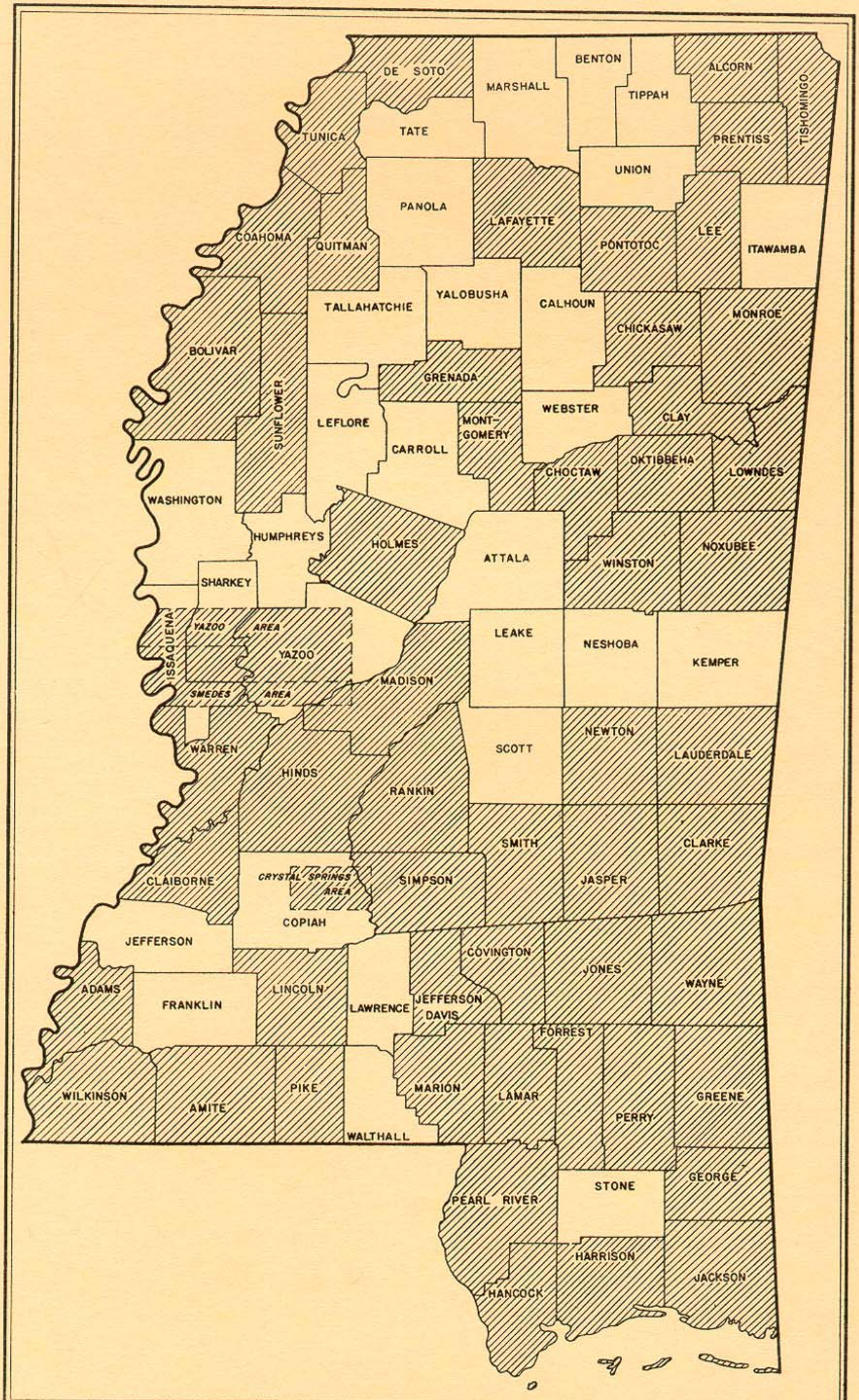
(7) Thorp, J., and Smith, Guy D.
1949. HIGHER CATEGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117–126.

(8) United States Department of Agriculture.
1938. SOILS AND MEN. U. S. Dept. Agr. Ybk. 1938, 1232 pp., illus.

(9) ———
1951. SOIL SURVEY MANUAL. U. S. Dept. Agr. Handb. 18, 503 pp., illus. [Replaces U. S. Dept. Agr. Misc. Pub. 274, the *Soil Survey Manual* published in 1937.]

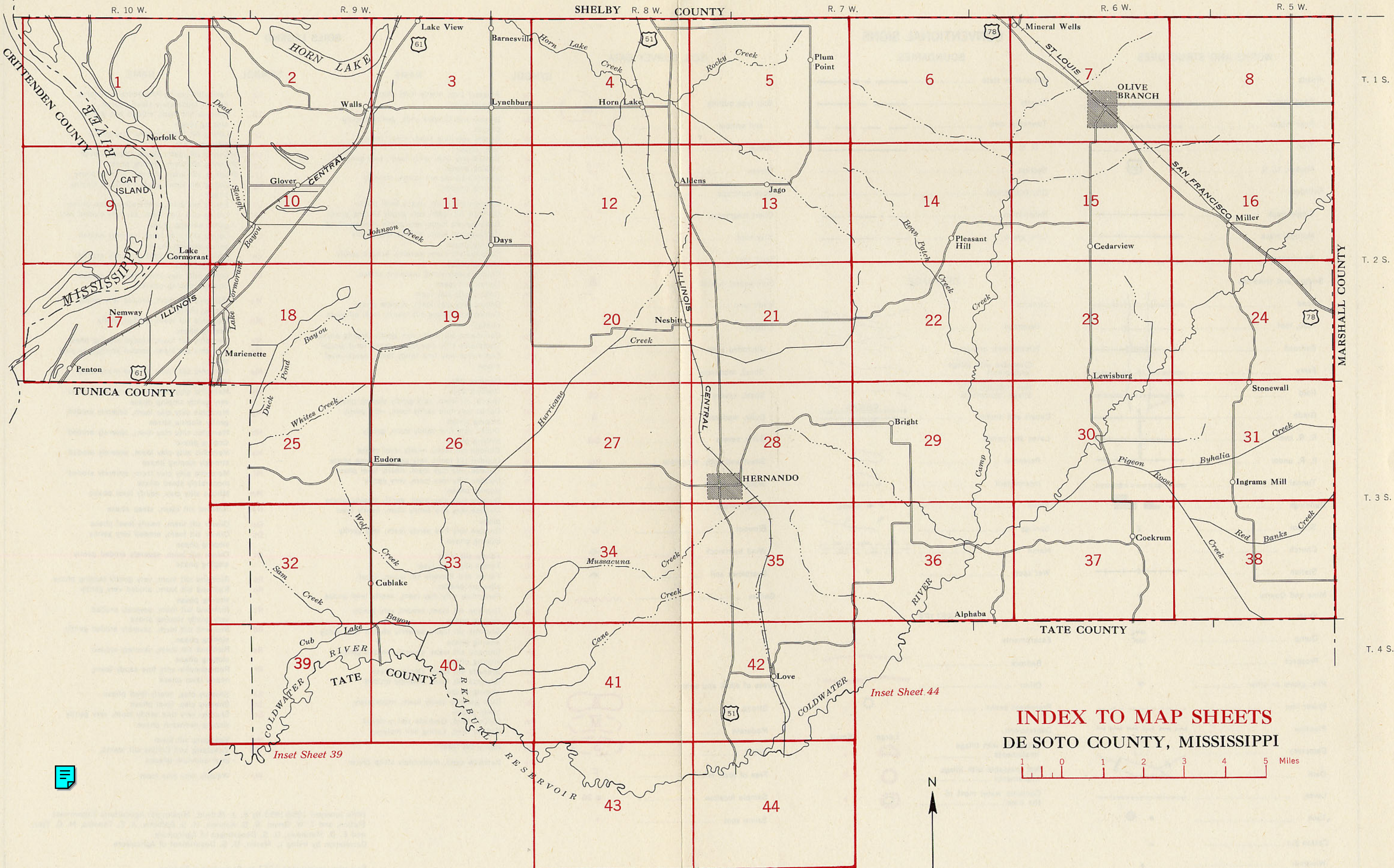
(10) Vestal, F. E., and McCutcheon, T. E.
1942. ADAMS COUNTY MINERAL RESOURCES. Miss. State Geol. Survey Bul. 47, 200 pp., illus.

(11) Waterways Experiment Station.
1953. UNIFIED SOIL CLASSIFICATION SYSTEM. 3 v., Corps of Engin., U. S. Army, Tech. Memo. 3–357. Prepared for Off., Chief of Engin., Vicksburg, Miss.



Areas surveyed in Mississippi shown by shading.

INDEX TO MAP SHEETS



INDEX TO MAP SHEETS
DE SOTO COUNTY, MISSISSIPPI

DE SOTO COUNTY, MISSISSIPPI

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Roads
- Good motor
- Poor motor
- Trail
- Marker, U. S. — 33

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mine and Quarry
- Shaft
- Dump
- Prospect

Pits, gravel or other

Power line

Pipeline

Cemetery

Dam

Levee

Tank

Cotton gin

Windmill

Canal lock (point upstream)

BOUNDARIES

- National or state
- County
- Township, civil
- U. S.
- Section
- City (corporate)
- Reservation
- Land grant

DRAINAGE

Streams
- Perennial
- Intermittent, unclass.
- Crossable with tillage implements
- Not crossable with tillage implements

Canals and ditches — CANAL / DITCH

Lakes and ponds
- Perennial
- Intermittent

Wells — flowing

Springs

Marsh

Wet spot

RELIEF

Escarpments
- Bedrock
- Other

Prominent peaks

Depressions — Large / Small
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

Soil type outline and symbol — Dx

Gravel

Stones

Rock outcrops

Chert fragments

Clay spot

Sand spot

Detrimental deposit

Made land

Erosion
- Uneroded spot — U
- Sheet, moderate — S
- Sheet, severe — SS
- Gully, moderate — G
- Gully, severe — GG
- Sheet and gully, moderate — SG
- Wind, moderate
- Wind, severe
- Blowout
- Wind hummock
- Overblown soil

Gullies

Areas of alkali and salts
- Strong — A
- Moderate — M
- Slight — S
- Free of toxic effect — F

Sample location — 26

Saline spot

SOILS LEGEND

SYMBOL	NAME
Aa	Alligator clay, nearly level phase
Ab	Alluvial soils
Ba	Beulah and Dundee soils, gently sloping phases
Bb	Bosket very fine sandy loam, nearly level phase
Bc	Bosket very fine sandy loam, very gently sloping phase
Bd	Brandon-Loring silt loams, strongly sloping phases
Ca	Calhoun silt loam, nearly level phase
Cb	Calhoun silt loam, very gently sloping phase
Cc	Calloway silt loam, very gently sloping phase
Cd	Calloway silt loam, eroded very gently sloping phase
Ce	Calloway silt loam, severely eroded gently sloping phase
Cf	Collins loamy sand, overwash phase
Cg	Collins silt loam
Ch	Collins silty clay loam
Ck	Collins silty clay loam, shallow phase
Cl	Collins and Falaya silt loams, local alluvium phases
Cm	Commerce silt loam, very gently sloping phase
Cn	Commerce silty clay loam, nearly level phase
Co	Commerce very fine sandy loam, nearly level phase
Da	Dowling clay
Db	Dowling soils
Dc	Dubbs silt loam, very gently sloping phase
Dd	Dubbs very fine sandy loam, very gently sloping phase
De	Dubbs very fine sandy loam, gently sloping phase
Df	Dundee silt loam, nearly level phase
Dg	Dundee silt loam, very gently sloping phase
Dh	Dundee silty clay loam, nearly level phase
Dk	Dundee silty clay loam, very gently sloping phase
Dl	Dundee silty clay loam, gently sloping phase
Dm	Dundee very fine sandy loam, nearly level phase
Dn	Dundee very fine sandy loam, very gently sloping phase
Fa	Falaya silt loam
Fb	Falaya silty clay loam
Fc	Falaya and Waverly silt loams, local alluvium phases
Fd	Forestdale silty clay loam, nearly level phase
Ga	Grenada silt loam, eroded very gently sloping phase
Gb	Grenada silt loam, severely eroded very gently sloping phase
Gc	Grenada silt loam, severely eroded gently sloping phase
Ge	Grenada silt loam, sloping phase
Gf	Grenada silt loam, severely eroded sloping phase
Gg	Guin gravelly sandy loam, moderately steep phase
Gh	Gullied land, Grenada soil material
Gk	Gullied land, Loring soil material
Ha	Henry silt loam
Ka	Kershaw sand, moderately steep phase
La	Lexington-Loring-Providence silt loams, eroded moderately steep phases
Lb	Lintonia silt loam, eroded very gently sloping phase
Lc	Loring silt loam, eroded very gently sloping phase
Ld	Loring silt loam, gently sloping phase
Le	Loring silt loam, sloping phase
Lf	Loring silt loam, strongly sloping phase
Lg	Loring silt loam, eroded strongly sloping phase
Lh	Loring silt loam, moderately steep phase
Lk	Loring silty clay loam, severely eroded very gently sloping phase
Ll	Loring silty clay loam, severely eroded gently sloping phase
Lm	Loring silty clay loam, severely eroded sloping phase
Ln	Loring silty clay loam, severely eroded strongly sloping phase
Ma	Memphis silt loam, eroded very gently sloping phase
Mb	Memphis silt loam, eroded gently sloping phase
Mc	Memphis silt loam, eroded sloping phase
Md	Memphis silt loam, eroded strongly sloping phase
Me	Memphis silt loam, eroded moderately steep phase
Mf	Memphis silty clay loam, severely eroded very gently sloping phase
Mg	Memphis silty clay loam, severely eroded gently sloping phase
Mh	Memphis silty clay loam, severely eroded sloping phase
Mk	Memphis silty clay loam, severely eroded strongly sloping phase
Ml	Memphis silty clay loam, severely eroded moderately steep phase
Mm	Mhoon silty clay, nearly level phase
Na	Natchez silt loam, steep phase
Oa	Olivier silt loam, nearly level phase
Ob	Olivier silt loam, eroded very gently sloping phase
Oc	Olivier silt loam, severely eroded gently sloping phase
Ra	Richland silt loam, very gently sloping phase
Rb	Richland silt loam, eroded very gently sloping phase
Rc	Richland silt loam, severely eroded very gently sloping phase
Rd	Richland silt loam, severely eroded gently sloping phase
Re	Richland silt loam, severely eroded sloping phase
Rf	Robinsonville very fine sandy loam, nearly level phase
Sa	Sharkey clay, nearly level phase
Sb	Sharkey clay, level phase
Sc	Sharkey very fine sandy loam, very gently sloping overwash phase
Va	Vicksburg silt loam
Vb	Vicksburg and Collins silt loams, local alluvium phases
Wa	Waverly silty clay loam

Soils surveyed 1950-1953 by E. J. McNutt, Mississippi Agricultural Experiment Station, and T. W. Green, R. B. Kahrein, H. S. Galberry, A. E. Thomas, M. C. Tyer, and E. D. Matthews, U. S. Department of Agriculture.
Correlation by Irving L. Martin, U. S. Department of Agriculture.

Soil map constructed 1957 by Cartographic Division, Soil Conservation Service, USDA, from 1954 aerial photographs. Controlled mosaic based on polyconic projection, 1927 North American datum.

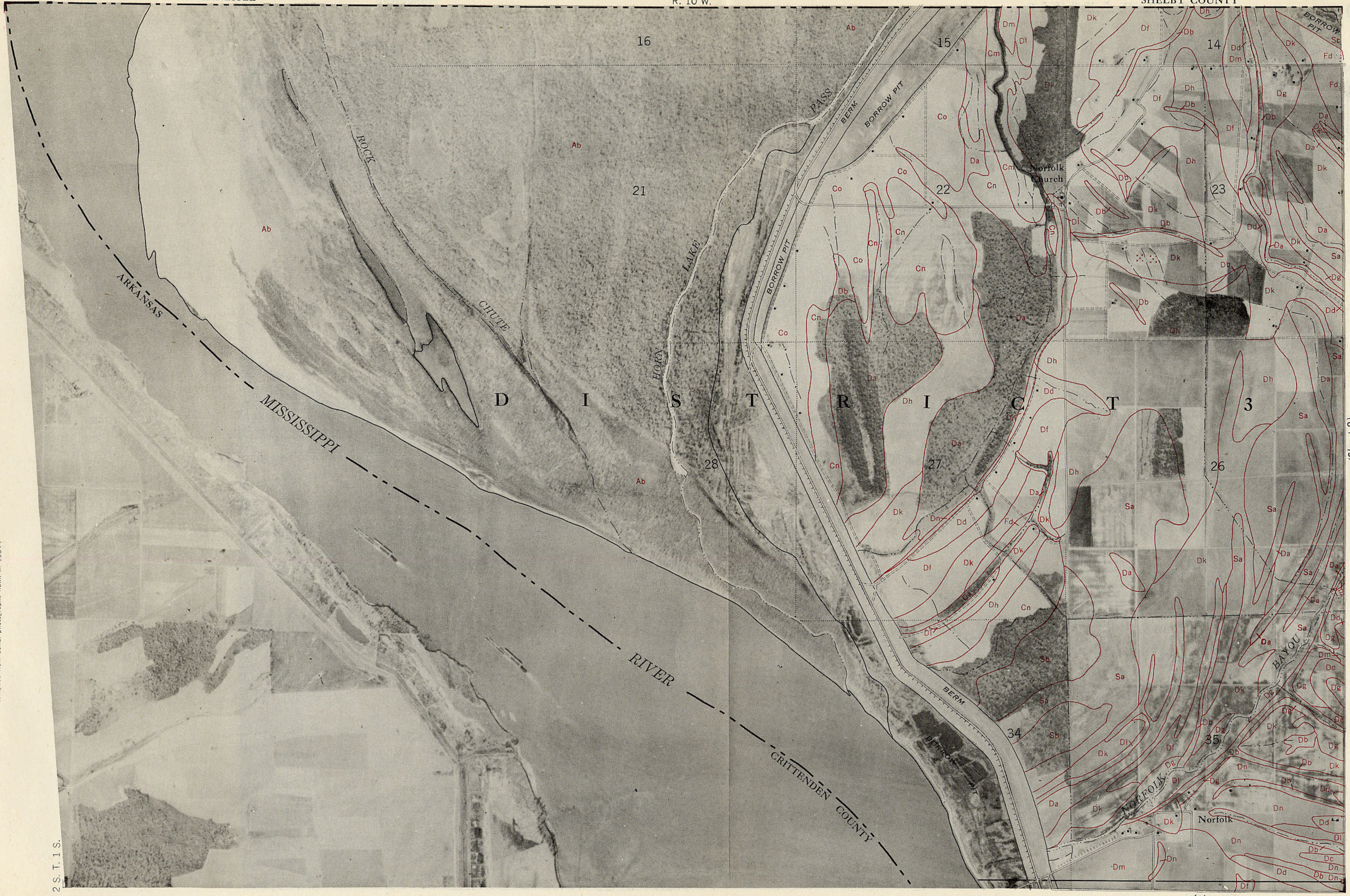
R. 10 W.

TENNESSEE

SHELBY COUNTY

1

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1954.



2 S. T. 1 S.

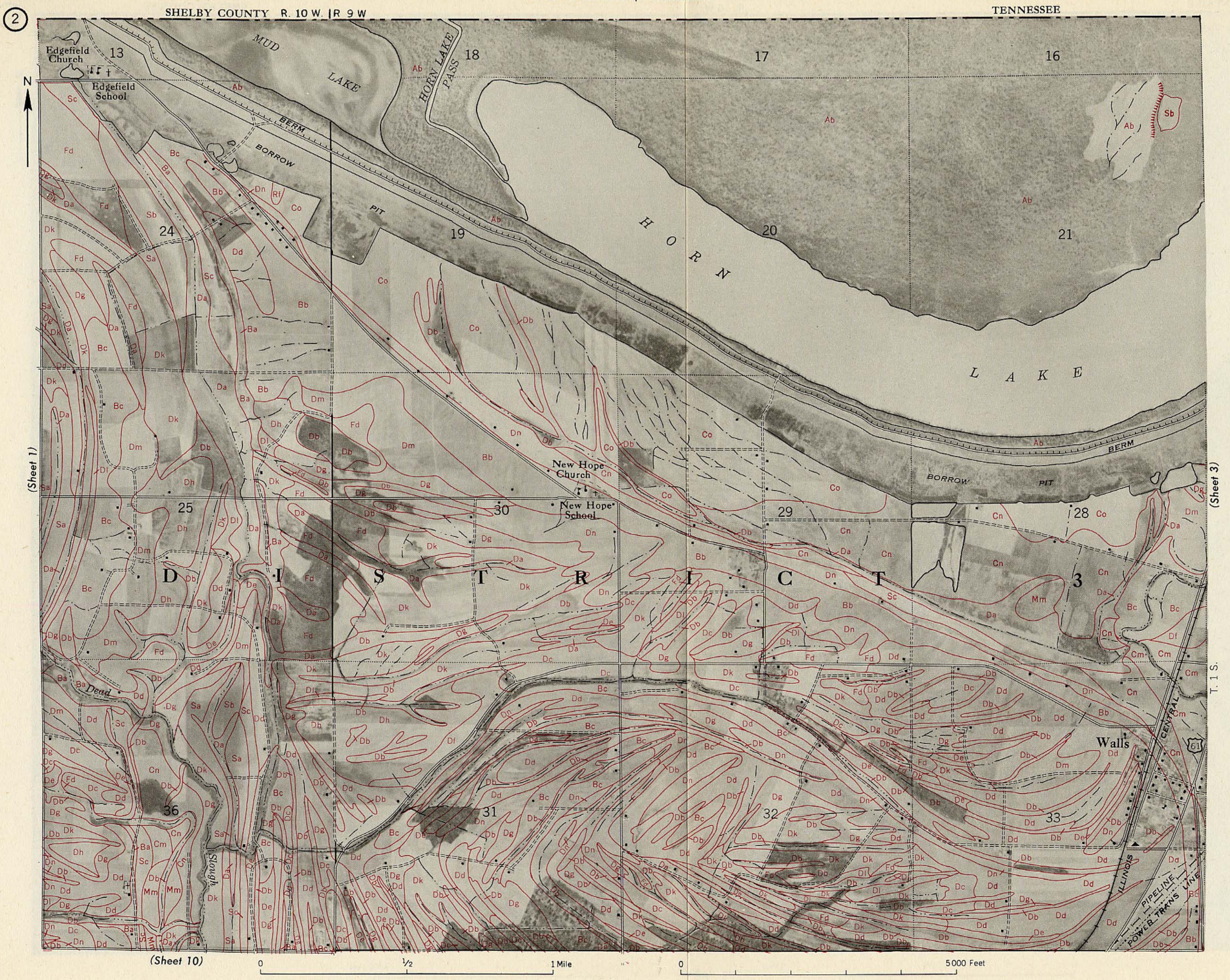
(Sheet 2)

(Sheet 9)

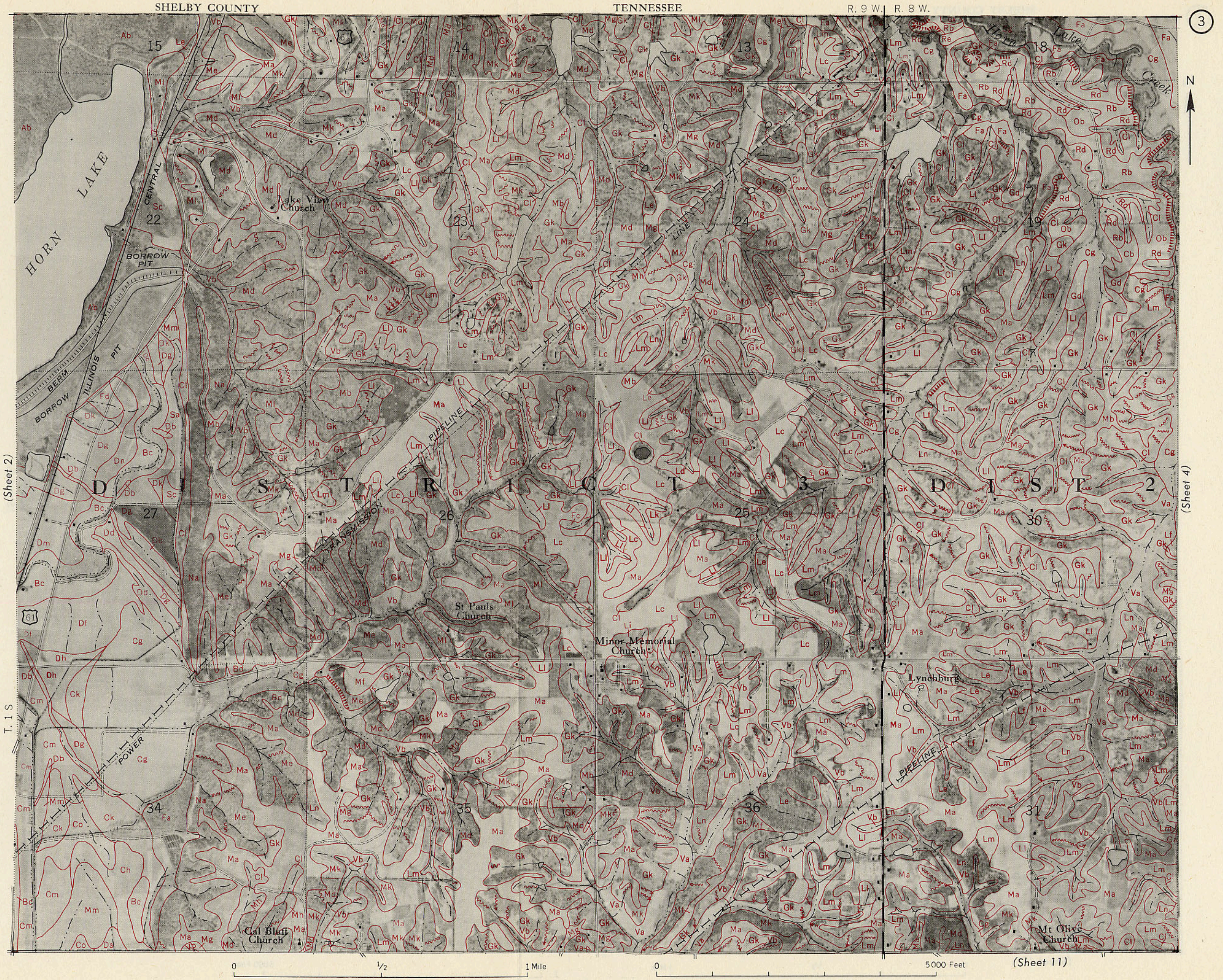
0 1/2 1 Mile

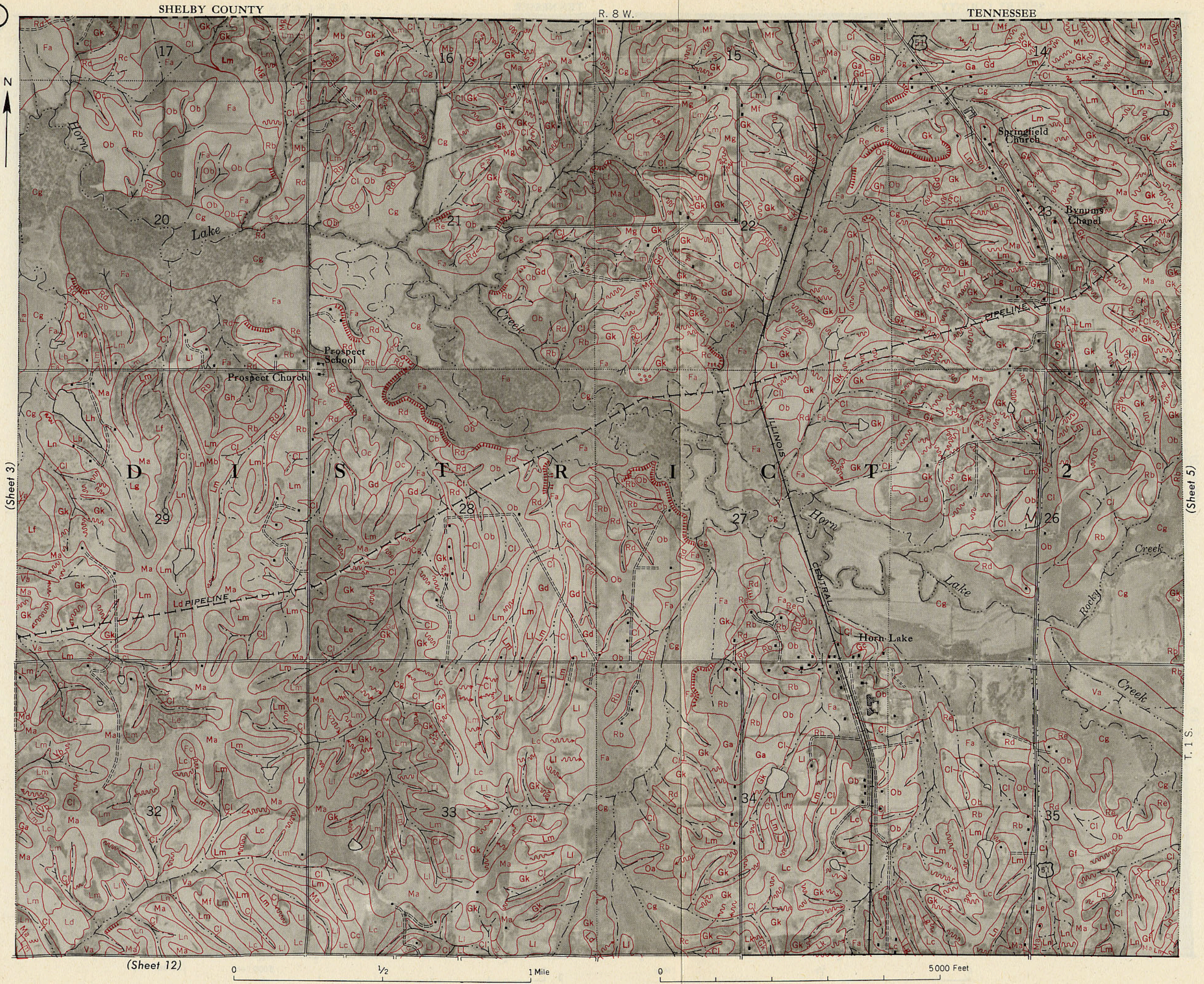
0 5000 Feet

DE SOTO COUNTY, MISSISSIPPI



DE SOTO COUNTY, MISSISSIPPI




SHELBY COUNTY
R. 8 W.
TENNESSEE
N
Springfield Church
Bynums Chapel
Prospect School
Prospect Church
D I S T R I C T 2
Horn Lake
Horn Lake Creek
Rocky Creek
ILLINOIS CENTRAL
PIPELINE
(Sheet 3)
(Sheet 5)
(Sheet 12)
T. 1 S.
0
1/2
1 Mile
0
5000 Feet

SHELBY COUNTY | TENNESSEE

R. 8 W. R. 7 W.

(Sheet 4)

(Sheet 6)

T. 1 S.

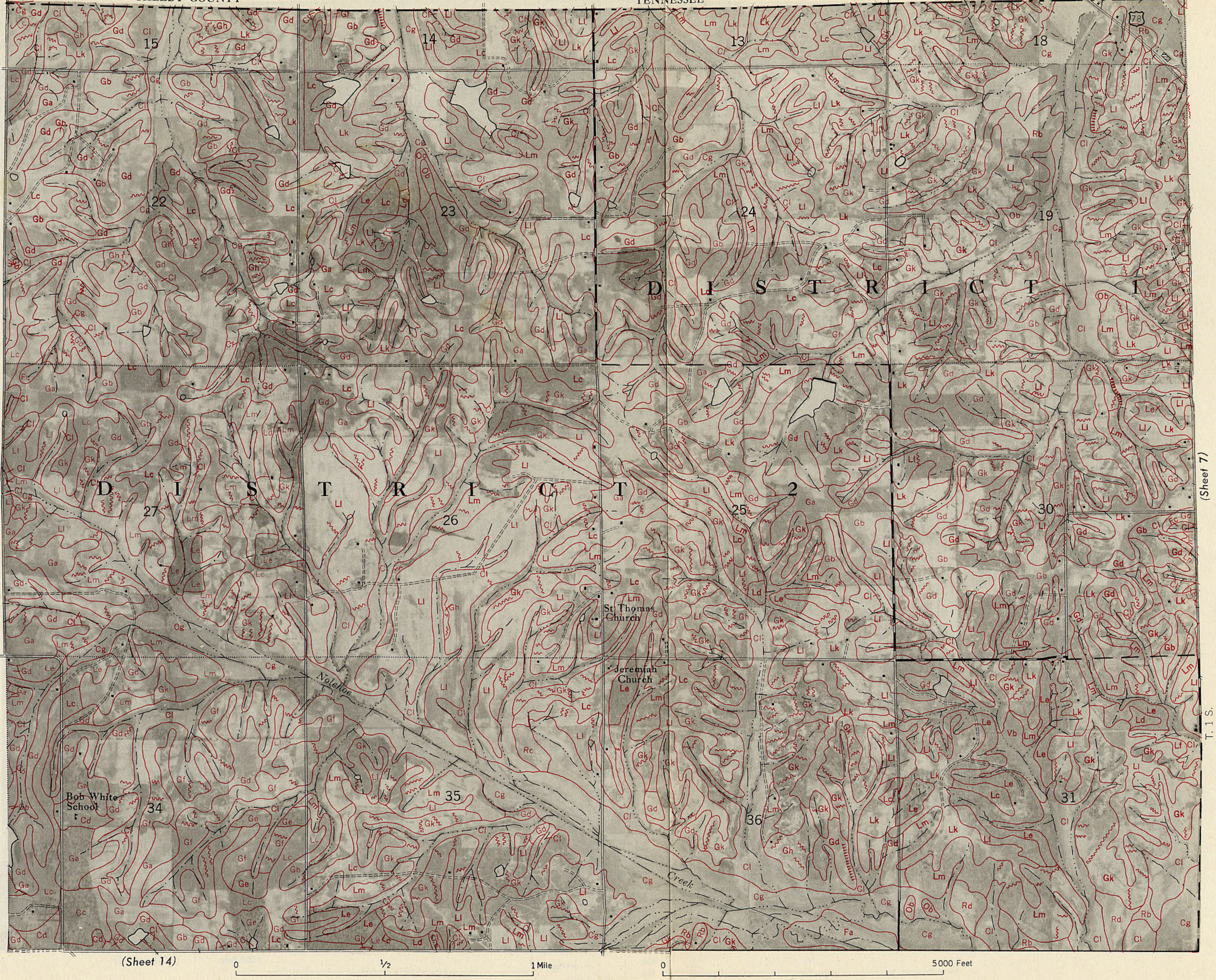
0 1/2 1 Mile

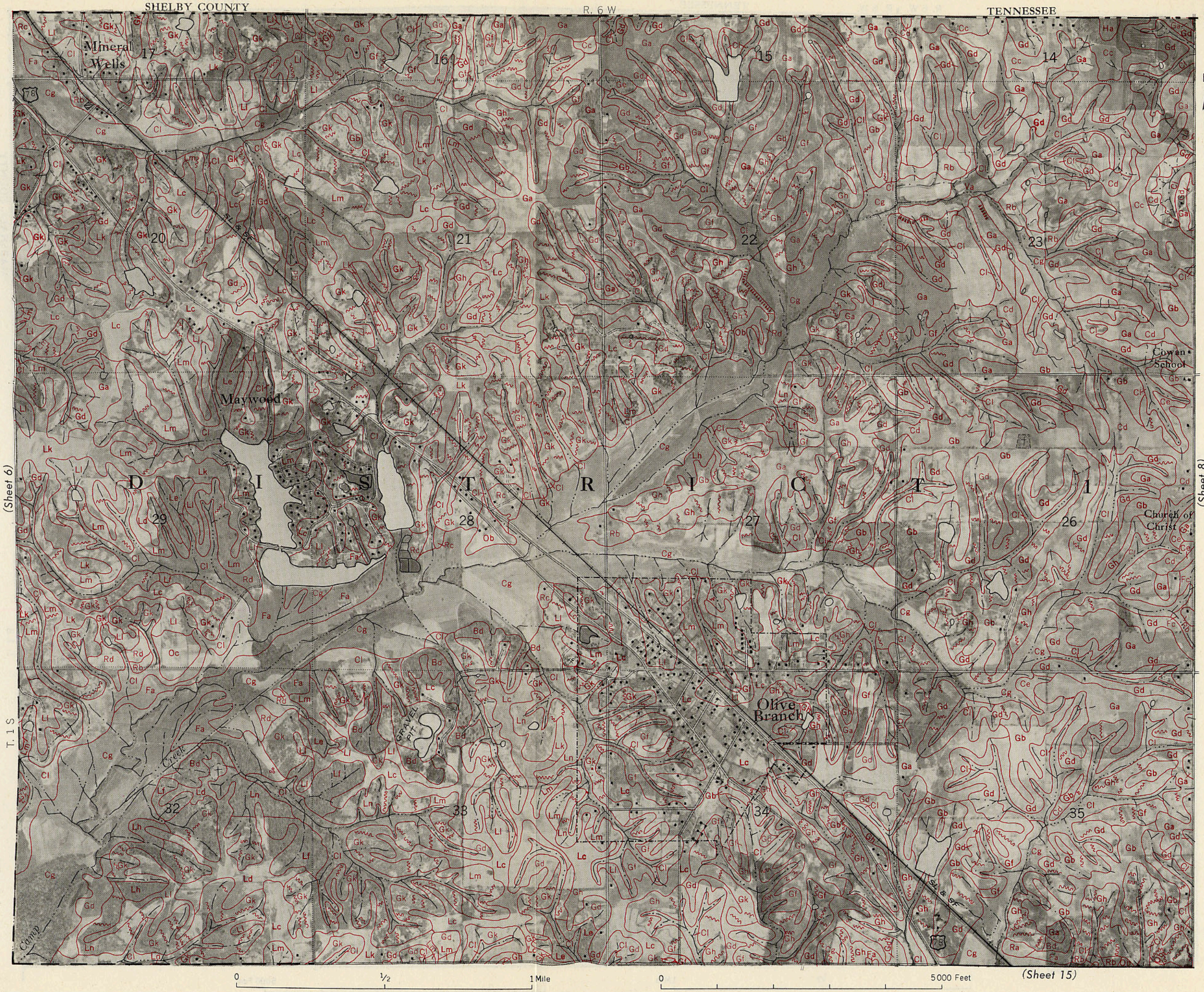
0 5000 Feet

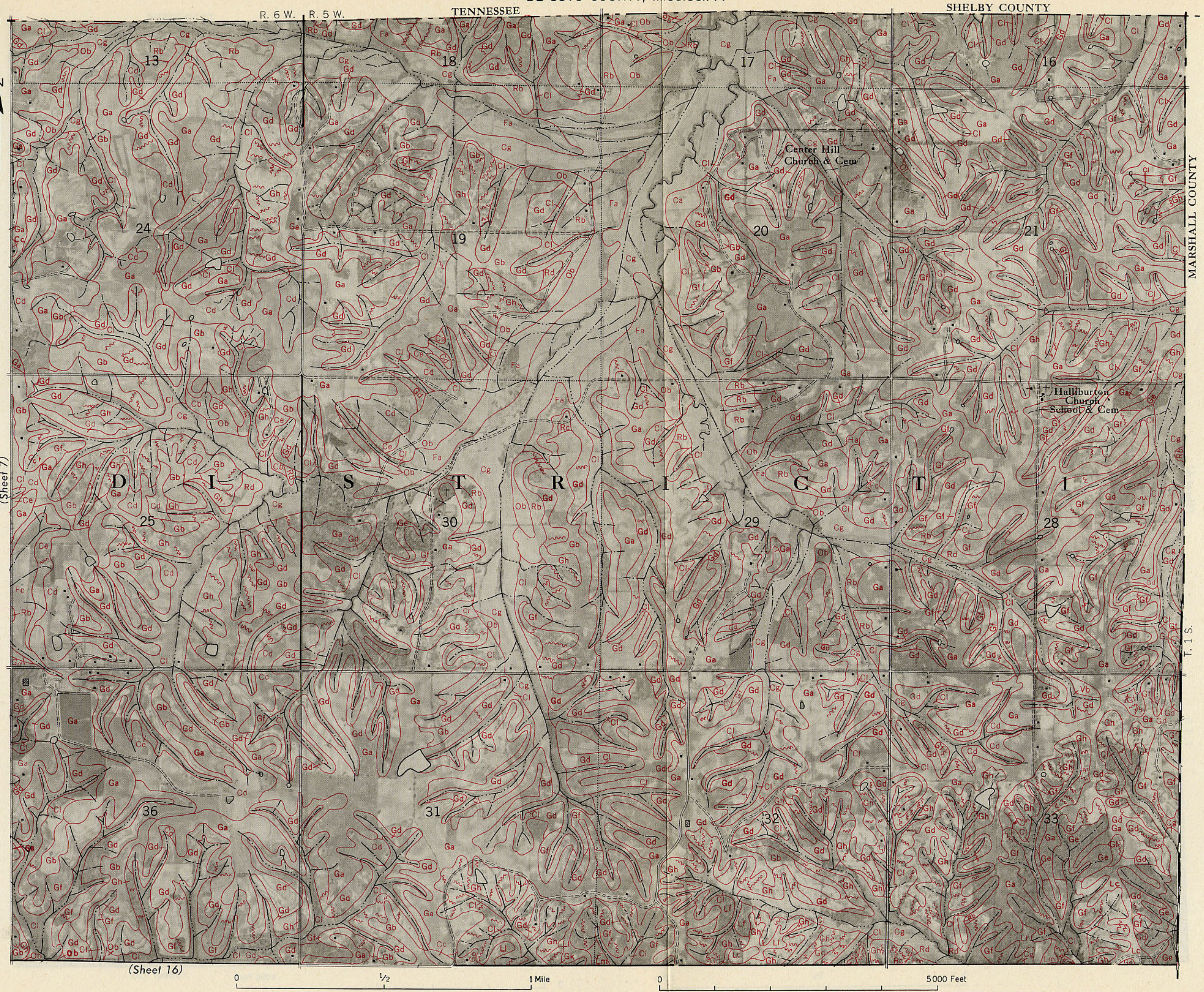
(Sheet 13)

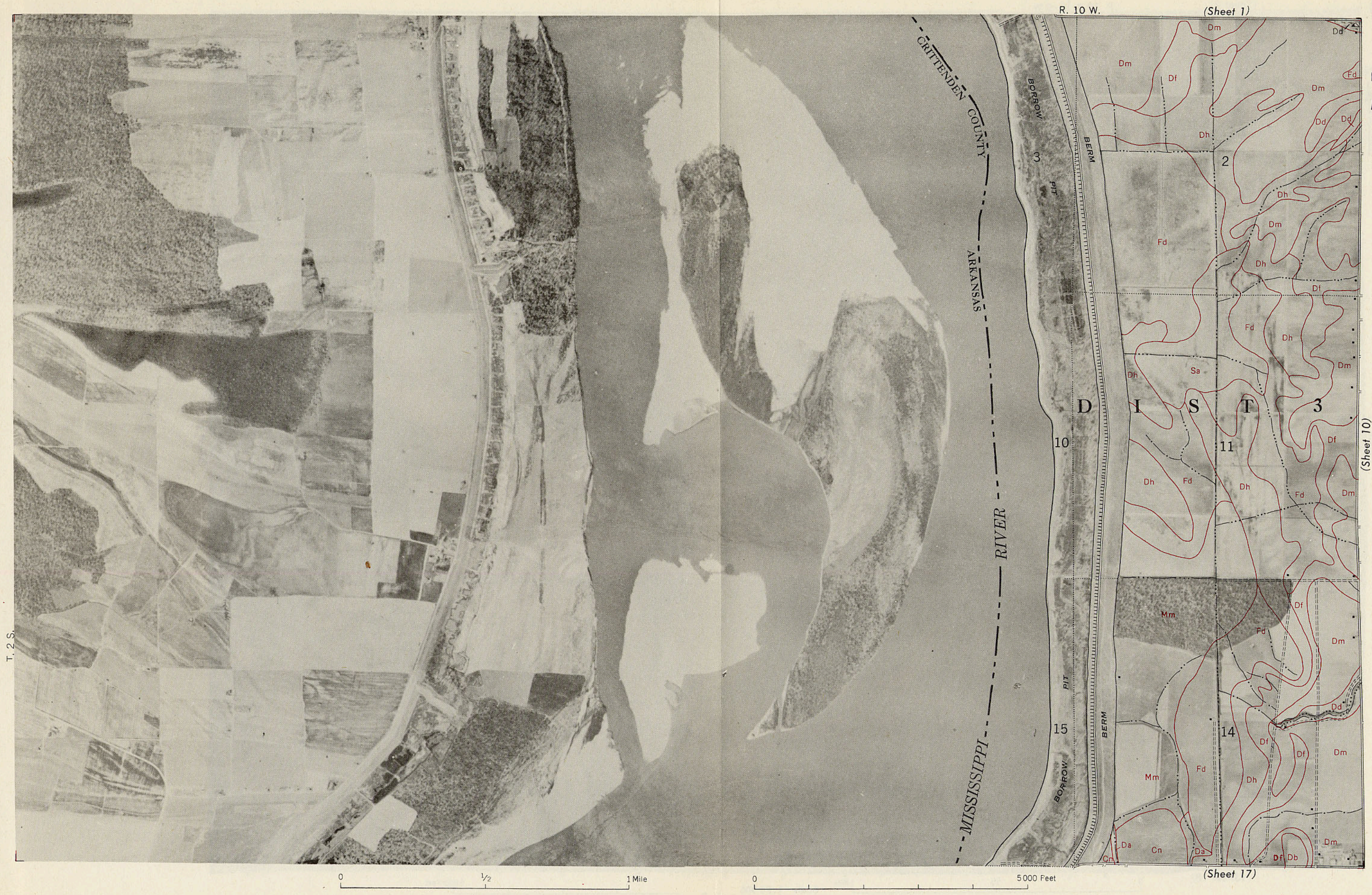
6

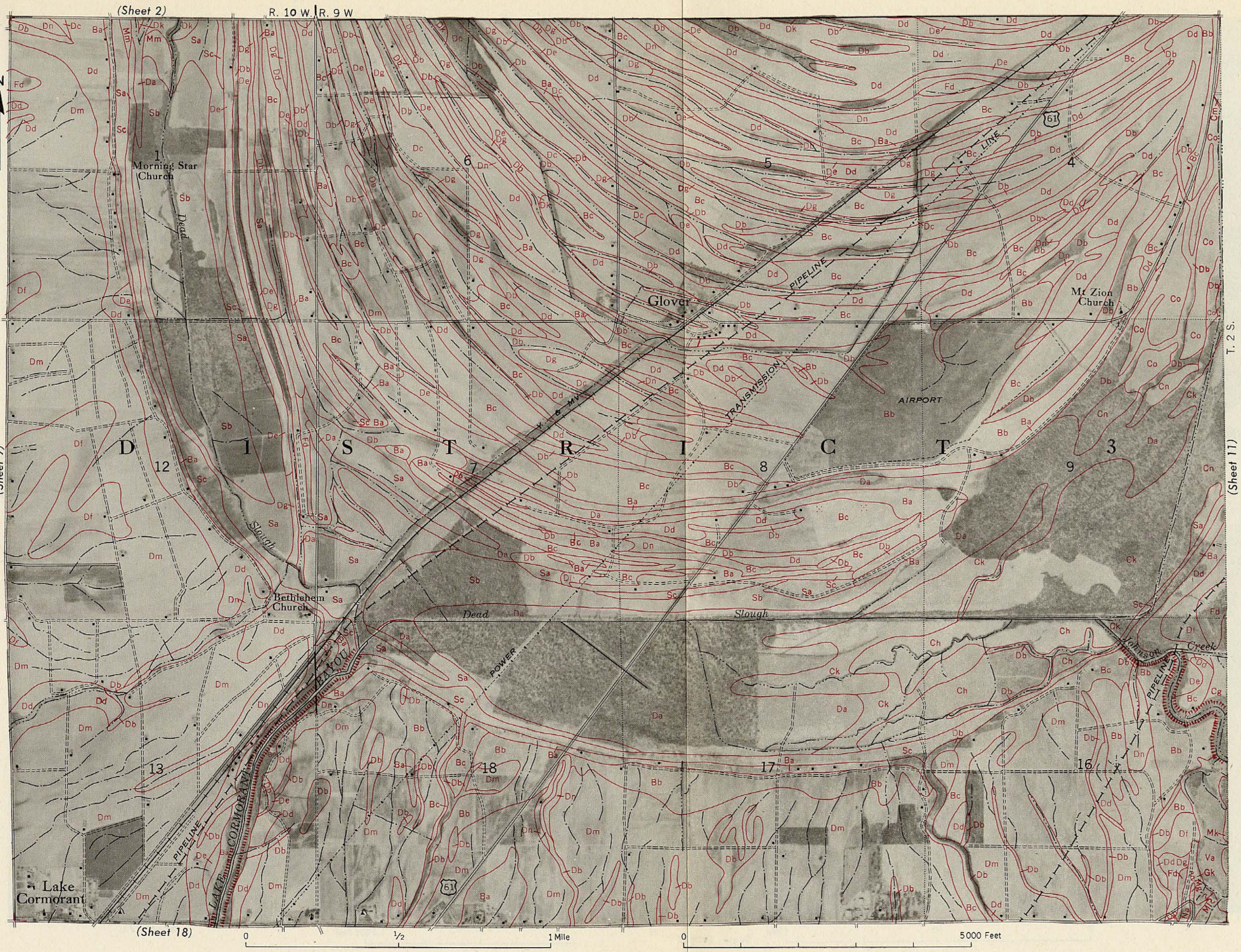
DE SOTO COUNTY, MISSISSIPPI

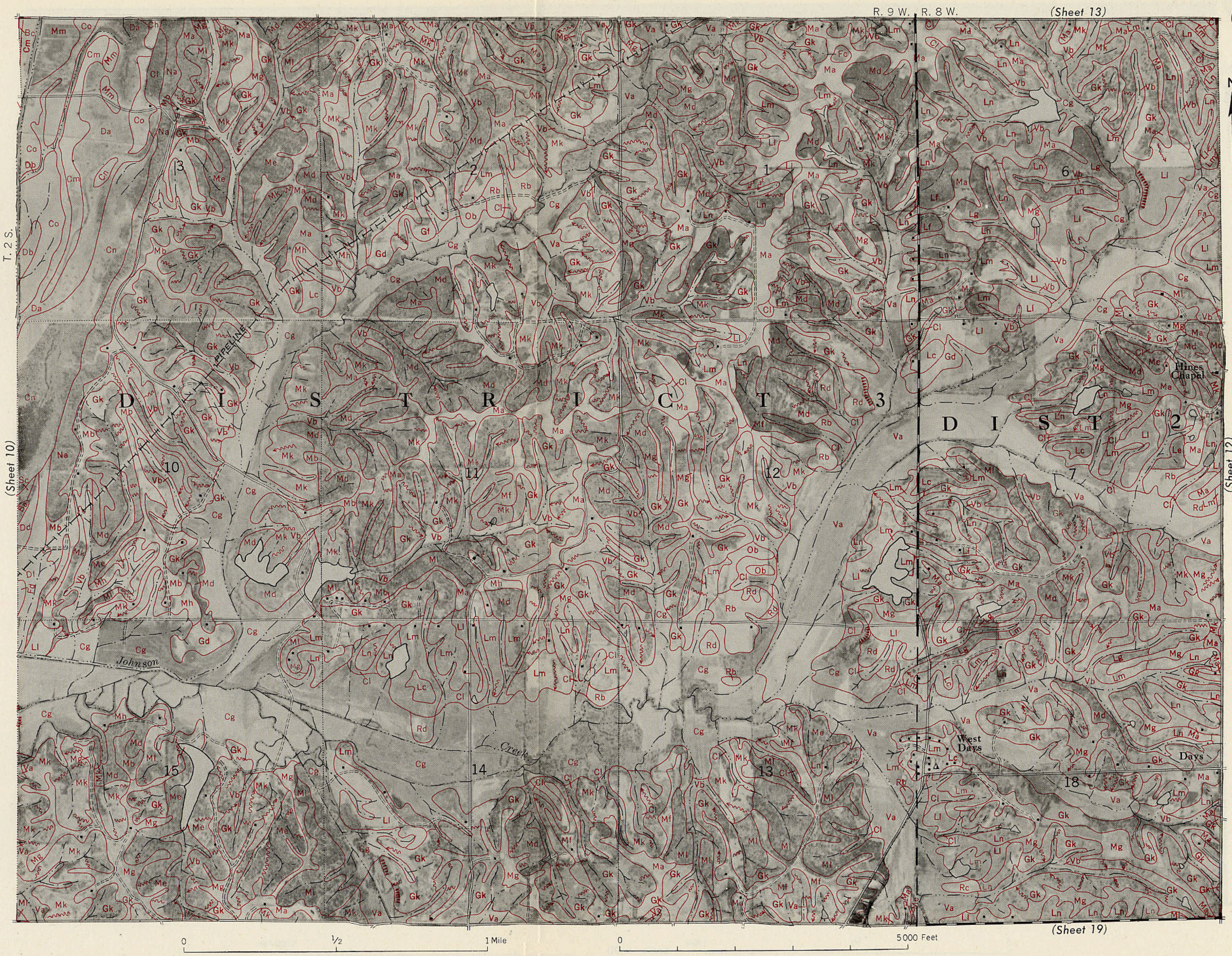


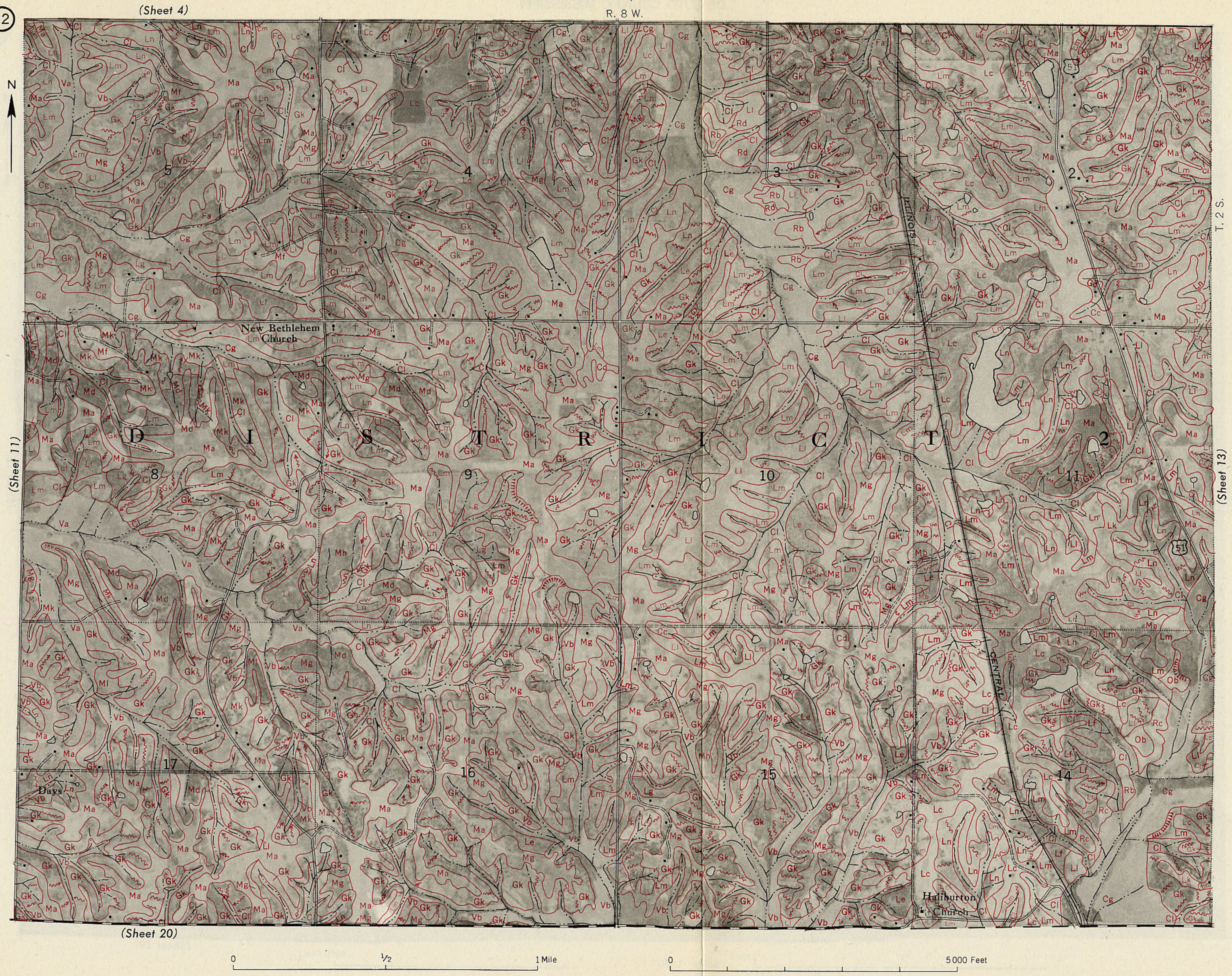

SHELBY COUNTY
R. 6 W.
TENNESSEE
Mineral Wells
Maywood
D I S T R I C T
Cowan School
Church of Christ
Olive Branch
GRAVEL PIT
Camp Creek
(Sheet 6)
(Sheet 8)
T. 1 S.
(Sheet 15)
0
1/2
1 Mile
0
5000 Feet

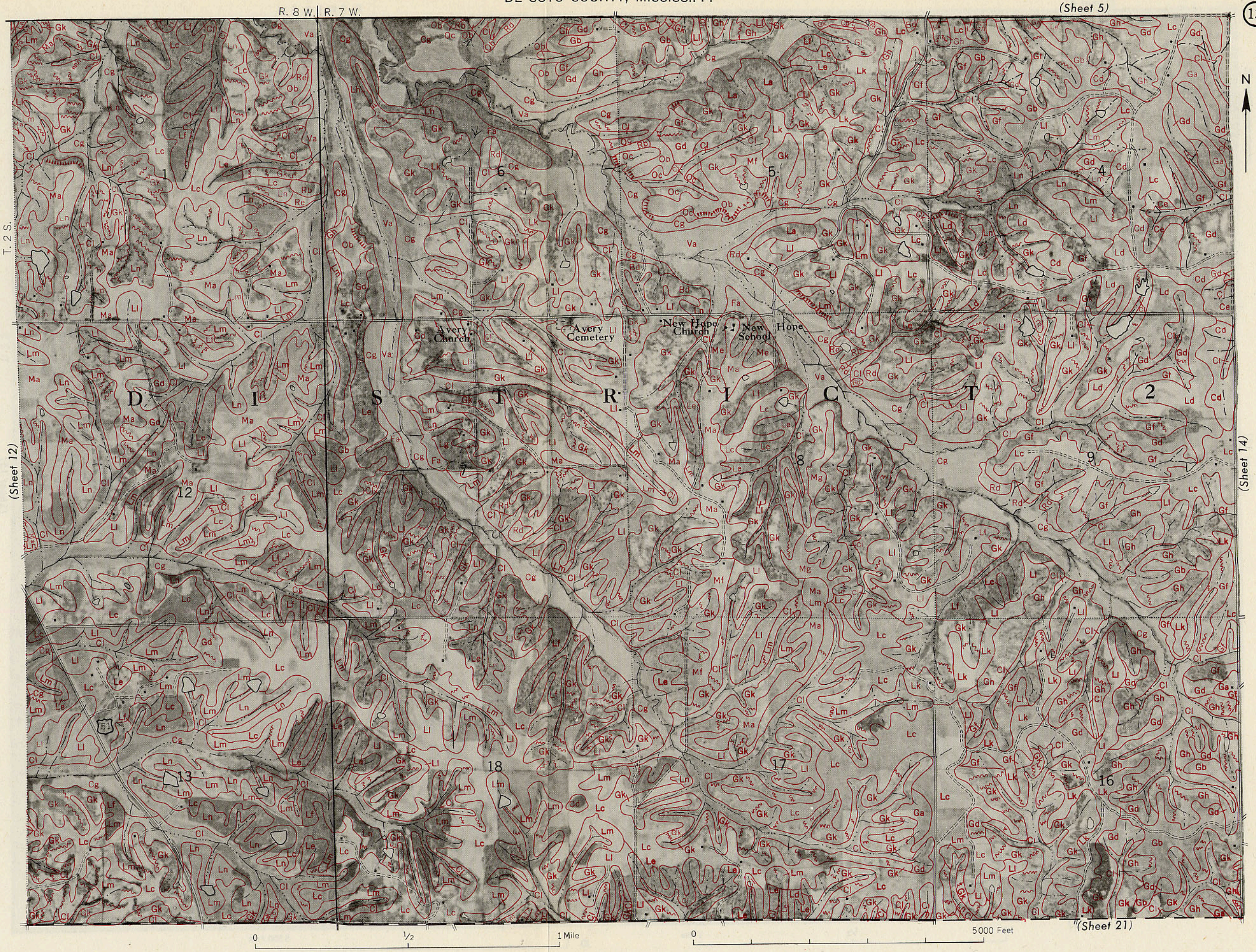

TENNESSEE
SHELBY COUNTY
R. 6 W.
R. 5 W.
N
MARSHALL COUNTY
(Sheet 7)
(Sheet 16)
Center Hill Church & Cem
Halliburton Church School & Cem
D I S T R I C T 1
T. 1 S.
13
18
17
16
24
19
20
21
25
30
29
28
36
31
32
33
0
1/2
1 Mile
0
5000 Feet

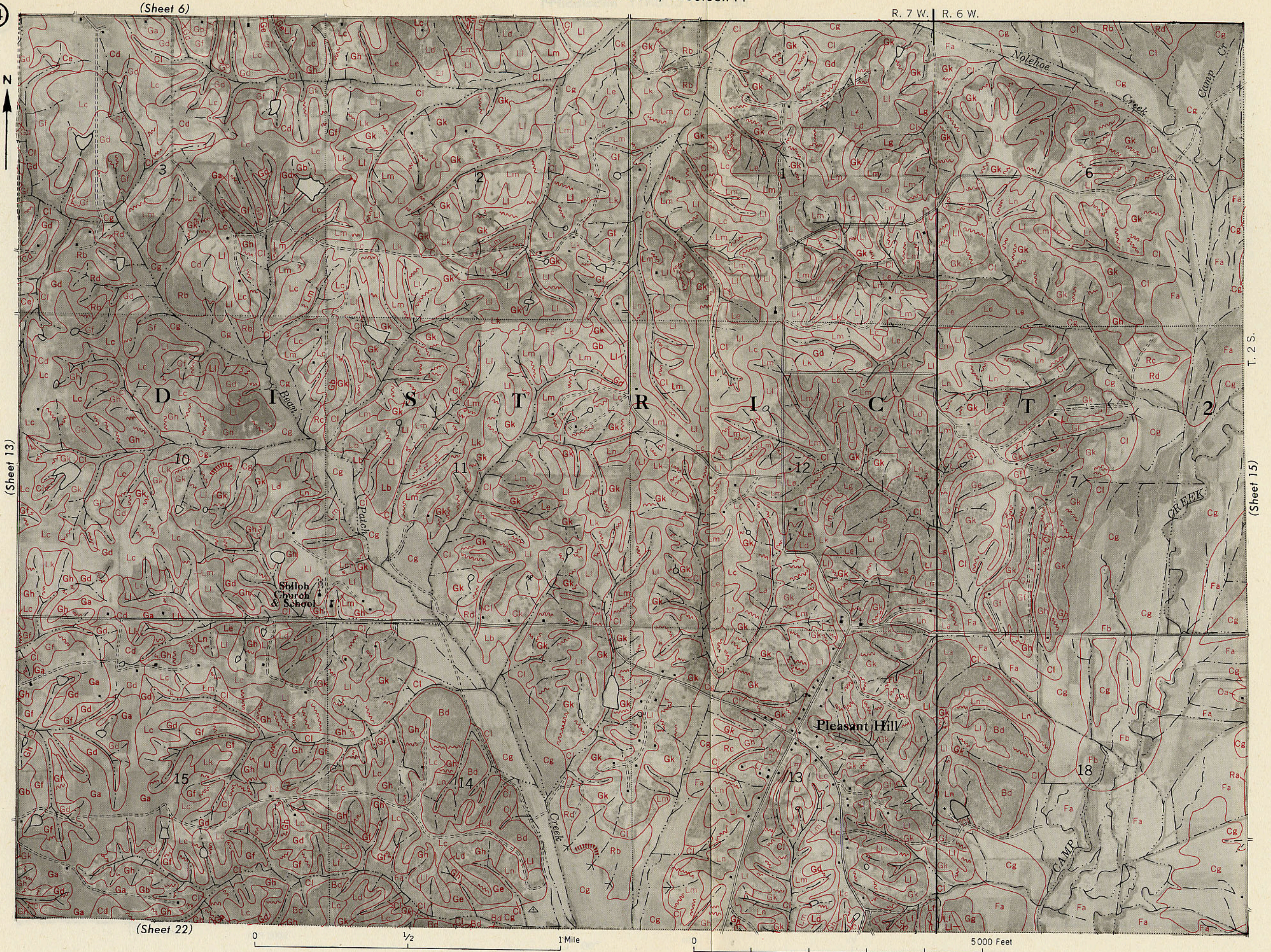

R. 10 W.
(Sheet 1)
N
T. 2 S.
CRITTENDEN COUNTY
ARKANSAS
MISSISSIPPI RIVER
BORROW PIT
BERM
D I S T 3
2
3
10
11
14
15
(Sheet 10)
(Sheet 17)
Dm
Dd
Df
Fd
Dh
Sa
Mm
Da
Cn
Db
0
1/2
1 Mile
0
5000 Feet

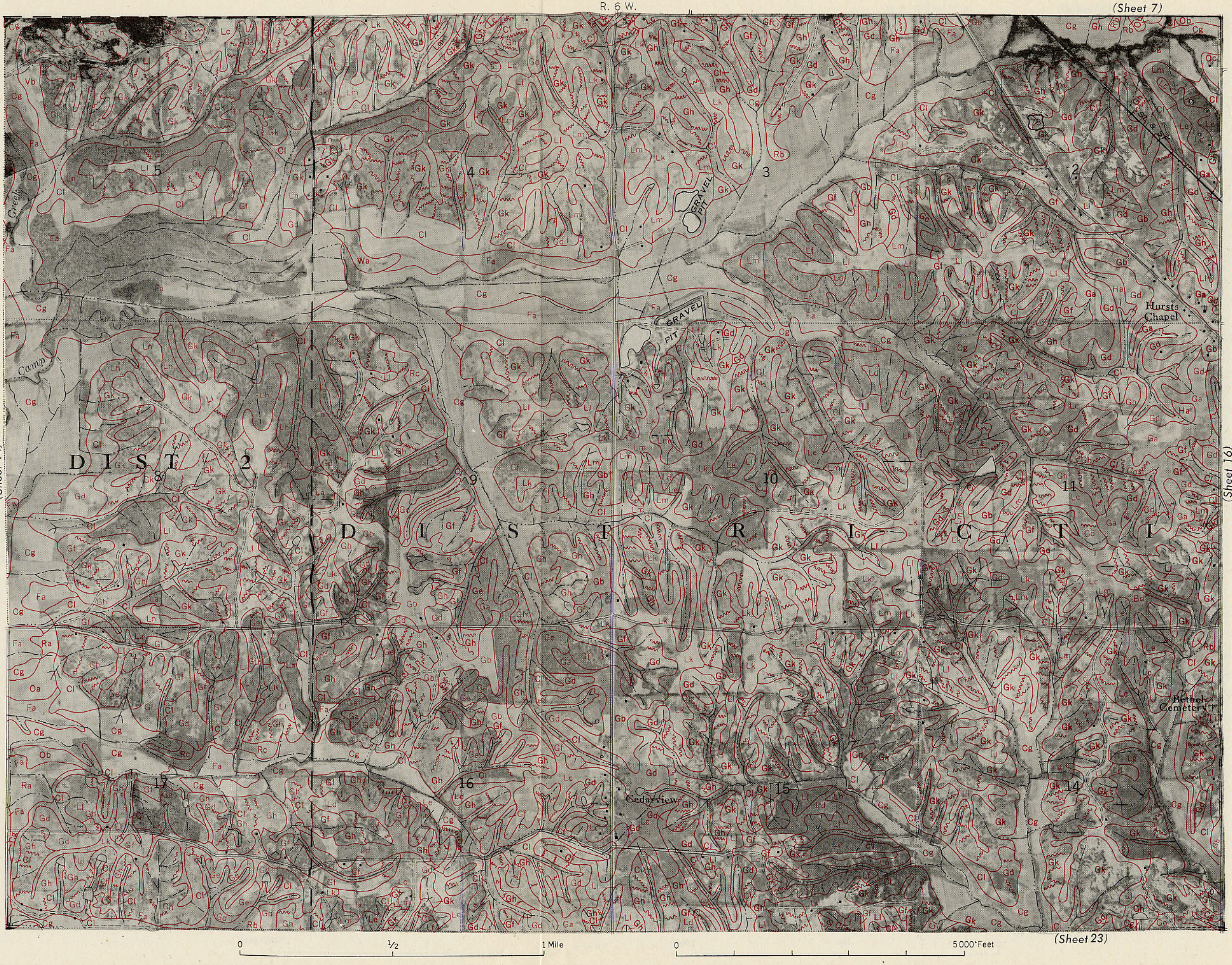

(Sheet 2)
R. 10 W.
R. 9 W.
N
(Sheet 9)
(Sheet 11)
(Sheet 18)
T. 2 S.
Morning Star Church
Glover
Mt Zion Church
AIRPORT
D I S T R I C T
3
Bethlehem Church
Dead Slough
Dead Slough
BAYOU
Johnson Creek
LAKE CORMORANT
Lake Cormorant
PIPELINE
TRANSMISSION LINE
POWER
Y. & M.V.
61
1
4
5
6
7
8
9
12
13
16
17
18
0
1/2
1 Mile
0
5000 Feet

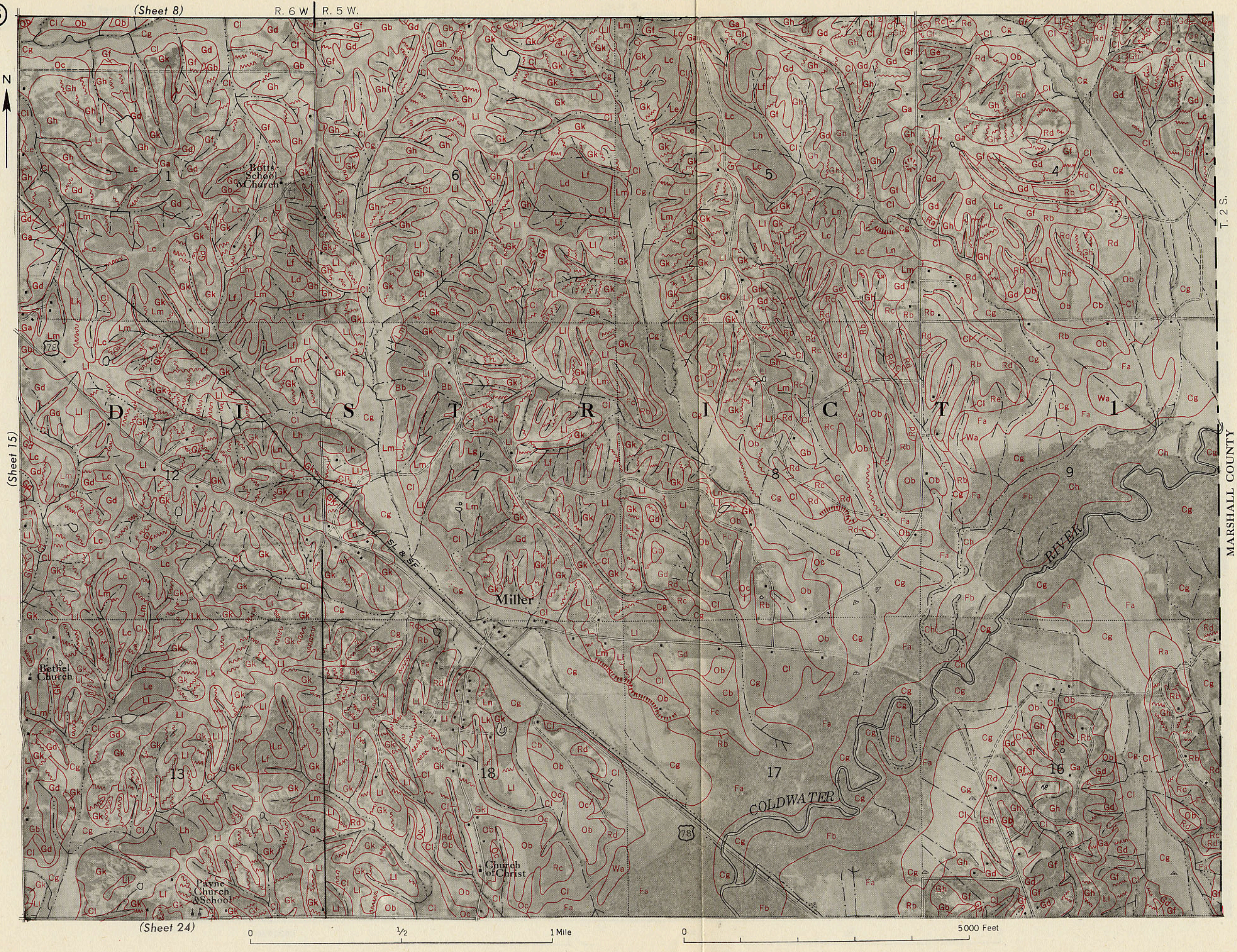

R. 9 W.
R. 8 W.
(Sheet 13)
N
T. 2 S.
(Sheet 10)
(Sheet 12)
(Sheet 19)
DISTRICT 3
DIST 2
PIPELINE
Johnson
Creek
Hines Chapel
West Days
Days
0
1/2
1 Mile
0
5000 Feet


(Sheet 4)
R. 8 W.
N
T. 2 S.
(Sheet 11)
(Sheet 13)
(Sheet 20)
DISTRICT 2
New Bethlehem Church
Days
Haliburton Church
ILLINOIS CENTRAL
51
5
4
3
2
8
9
10
11
17
16
15
14
0
1/2
1 Mile
0
5000 Feet

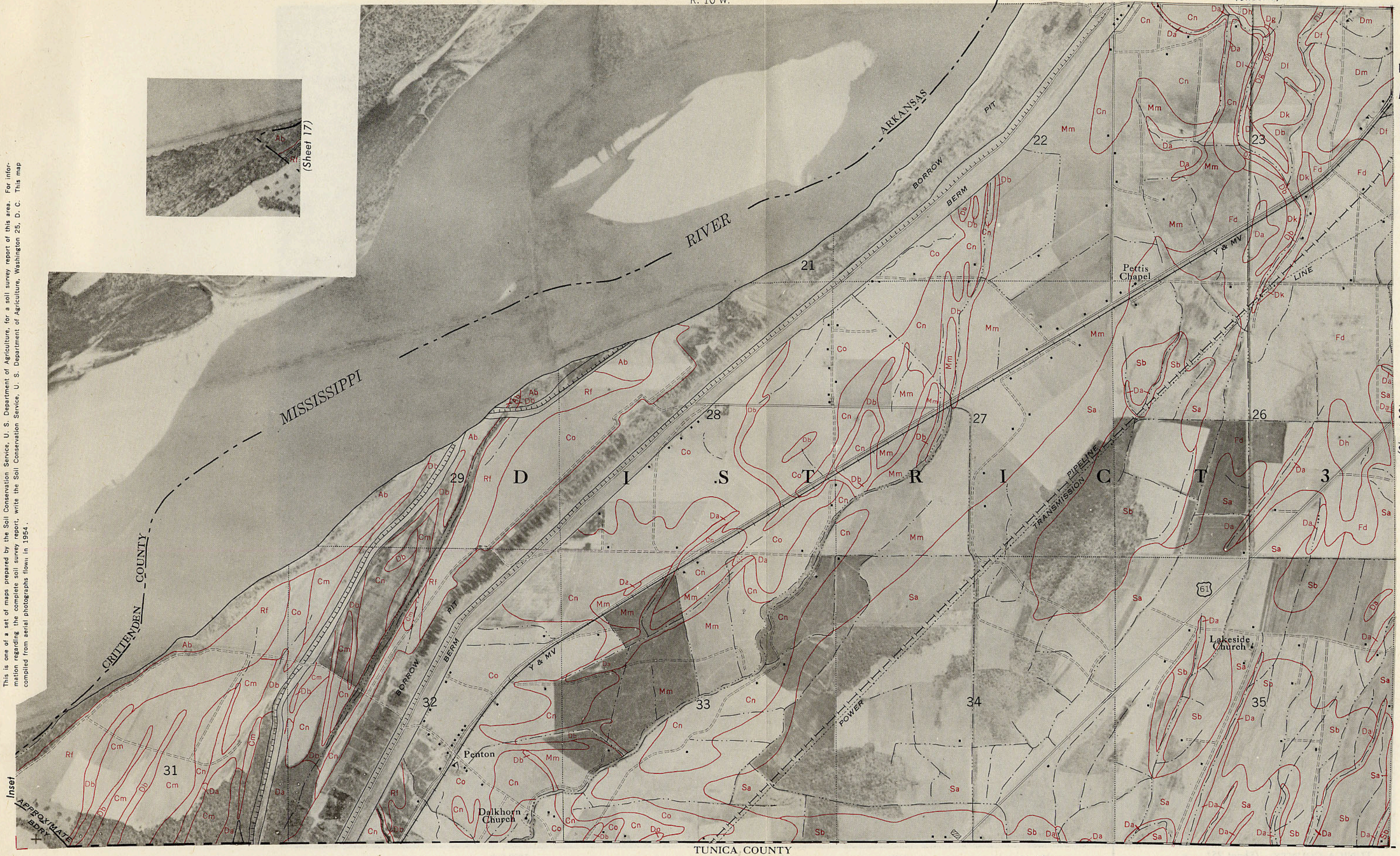

R. 8 W.
R. 7 W.
(Sheet 5)
T. 2 S.
(Sheet 12)
(Sheet 14)
(Sheet 21)
N
Avery Church
Avery Cemetery
New Hope Church
New Hope School
D I S T R I C T
0
1/2
1 Mile
0
5000 Feet


(Sheet 6)
R. 7 W.
R. 6 W.
N
(Sheet 13)
(Sheet 15)
T. 2 S.
D I S T R I C T 2
Creek
Camp Cr.
Shiloh Church & School
Pleasant Hill
CREEK
CAMP
Creek
(Sheet 22)
0
1/2
1 Mile
0
5000 Feet


R. 6 W.
(Sheet 7)
T. 2 S.
N
Camp Creek
GRAVEL PIT
GRAVEL PIT
Hursts Chapel
DIST 2
DISTRICT 1
(Sheet 14)
(Sheet 16)
Bethel Cemetery
Cedarview
(Sheet 23)
0
1/2
1 Mile
0
5000 Feet


(Sheet 8)
R. 6 W.
R. 5 W.
N
(Sheet 15)
(Sheet 24)
T. 2 S.
MARSHALL COUNTY
D I S T R I C T 1
Betts School & Church
Miller
SL & SF
78
Bethel Church
Payne Church & School
Church of Christ
COLDWATER
RIVER
0
1/2
1 Mile
0
5000 Feet

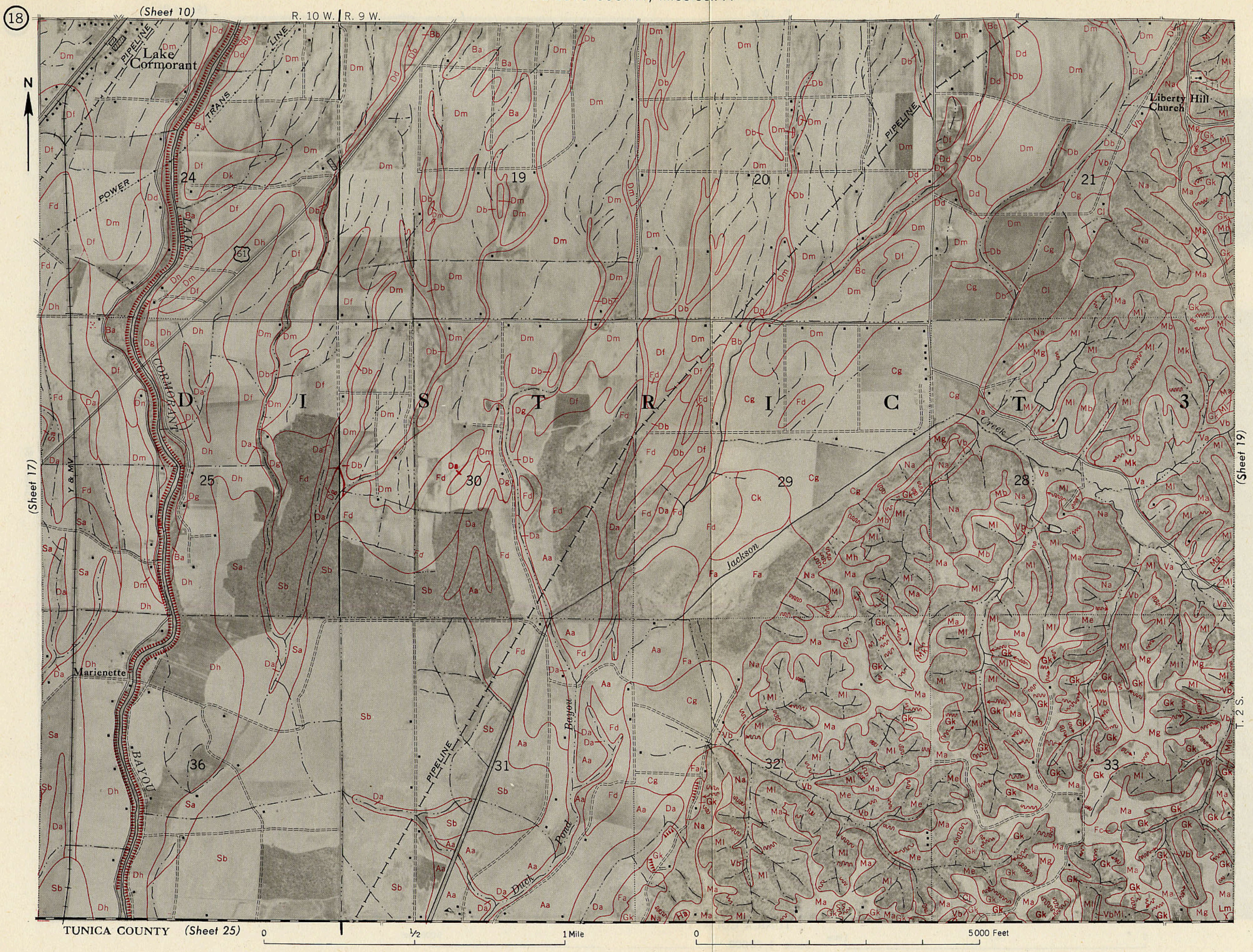
This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1954.

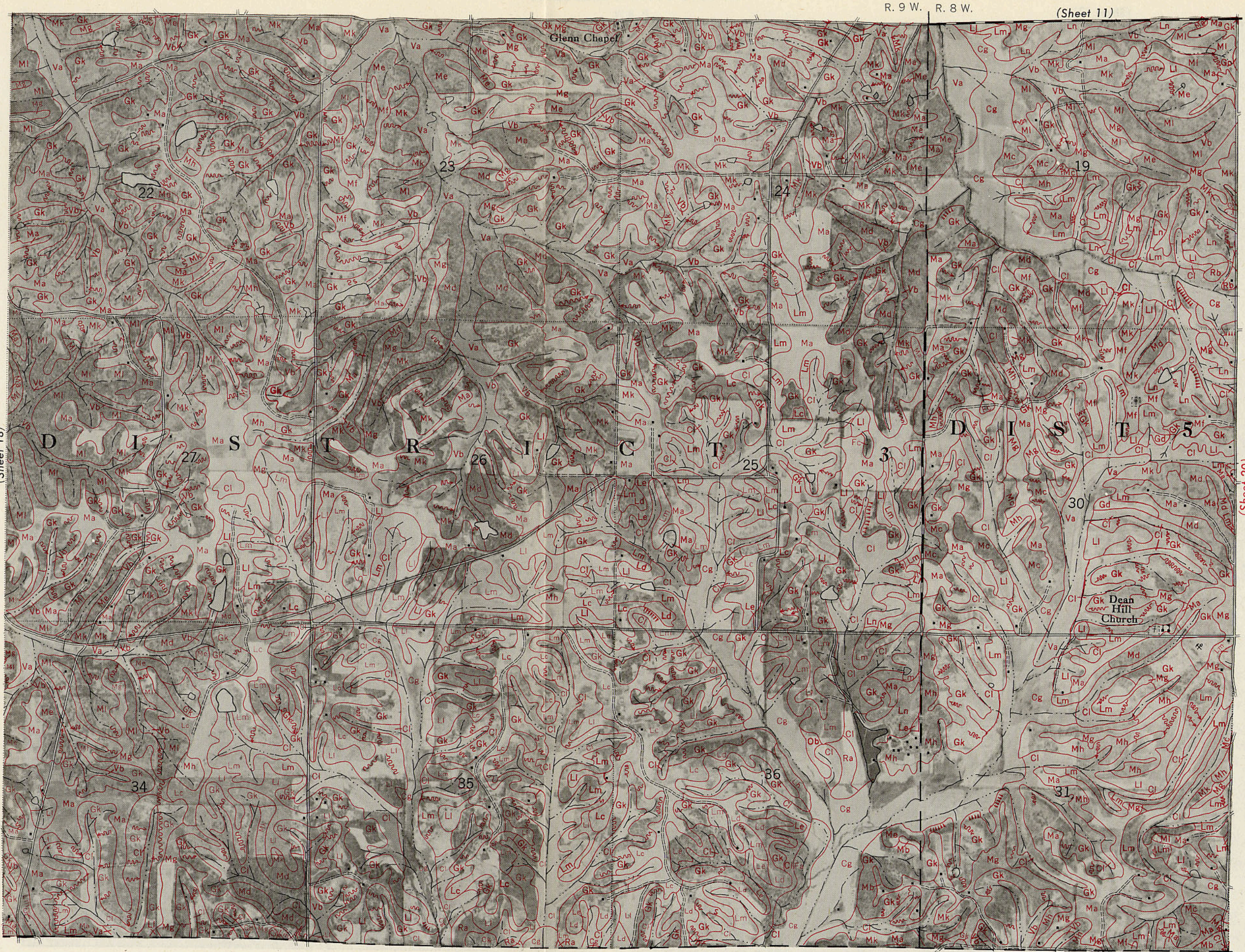


TUNICA COUNTY

0 1/2 1 Mile

0 5000 Feet

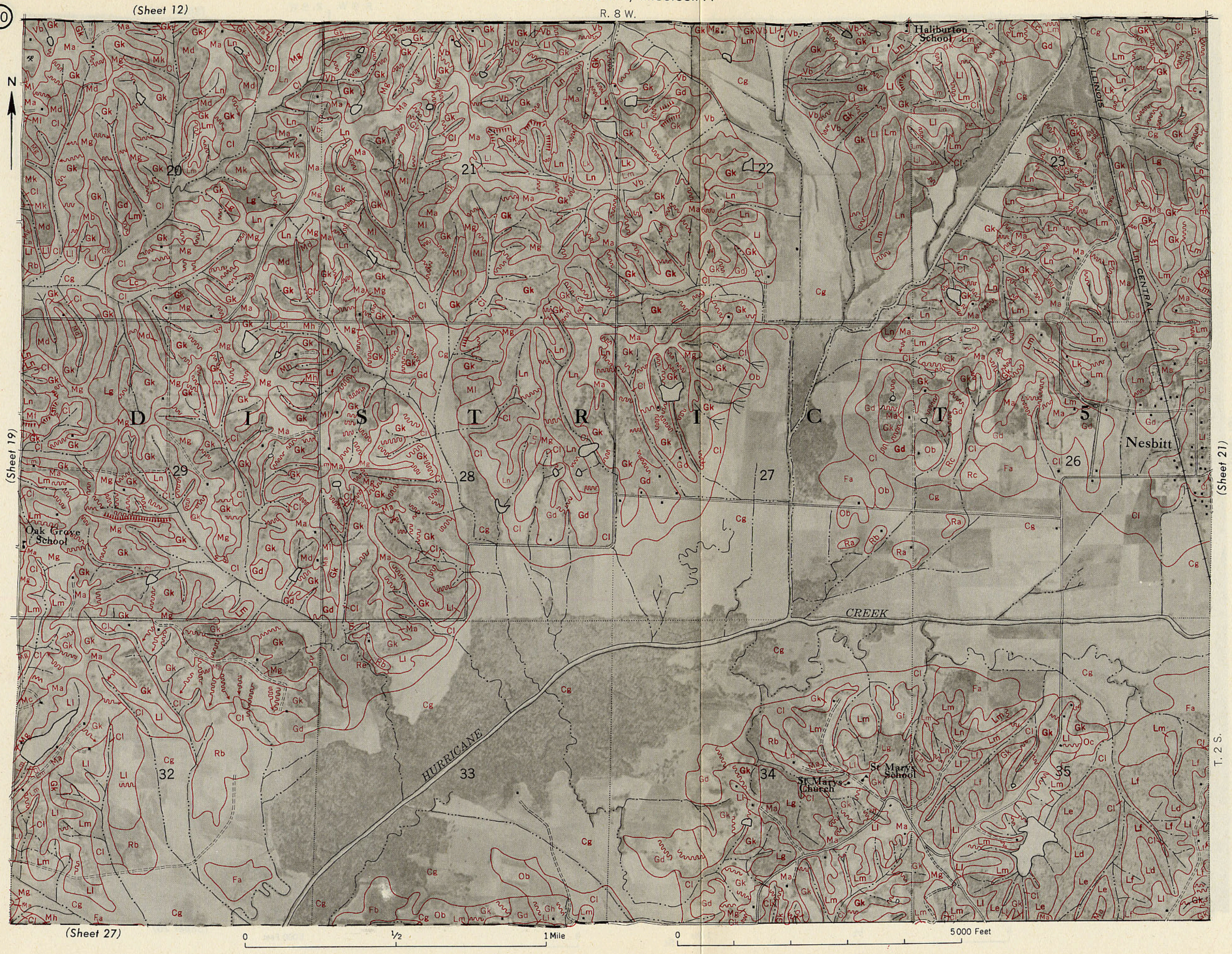

18
(Sheet 10)
R. 10 W. | R. 9 W.
Lake Cormorant
PIPELINE
POWER
TRANS
LINE
61
LAKE
CORMORANT
BAYOU
Y & MV
Marienette
Liberty Hill Church
D I S T R I C T 3
Jackson
Creek
Bayou
Duck
Pond
24
19
20
21
25
30
29
28
36
31
32
33
T. 2 S.
(Sheet 17)
(Sheet 19)
TUNICA COUNTY
(Sheet 25)
0
1/2
1 Mile
0
5000 Feet

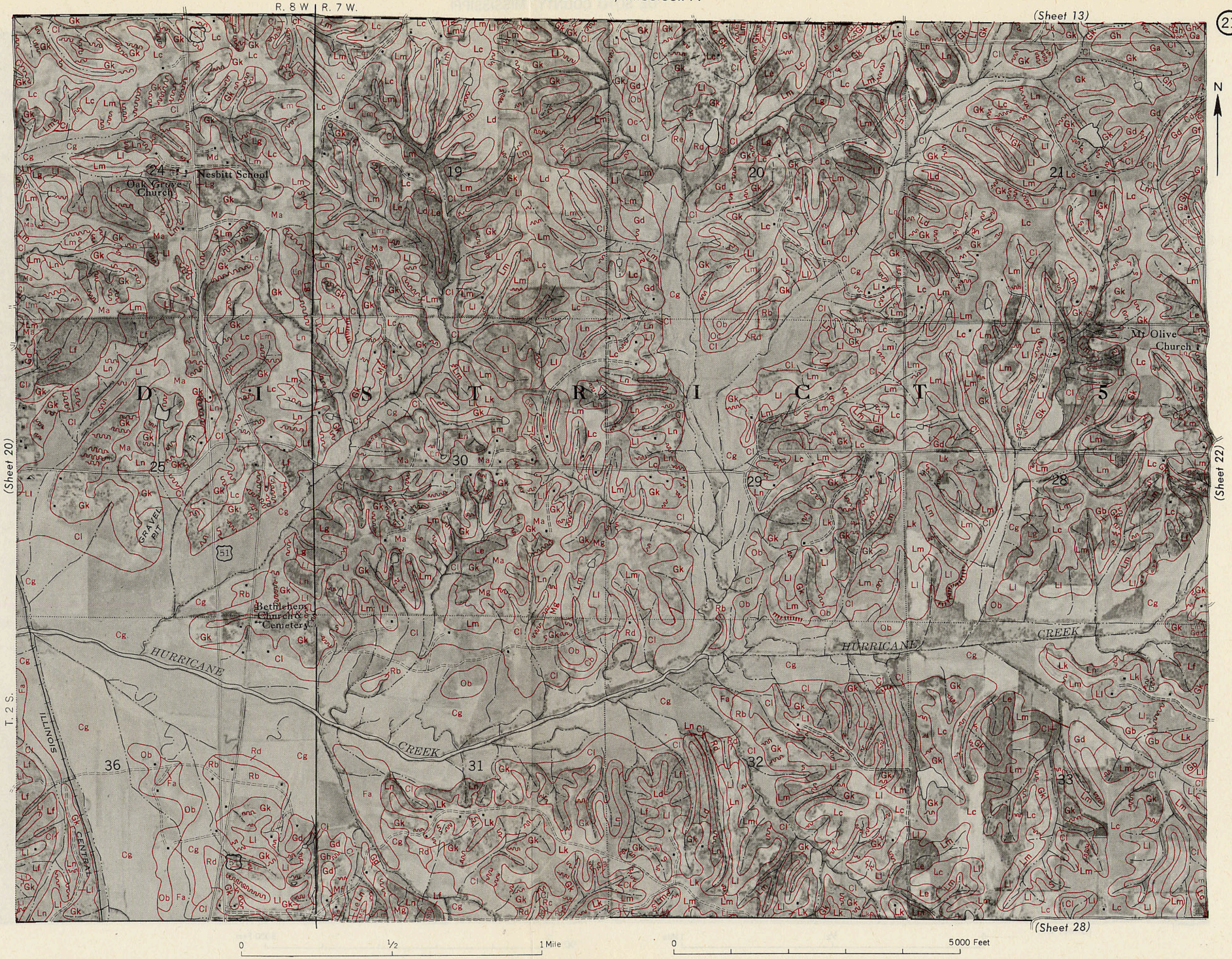


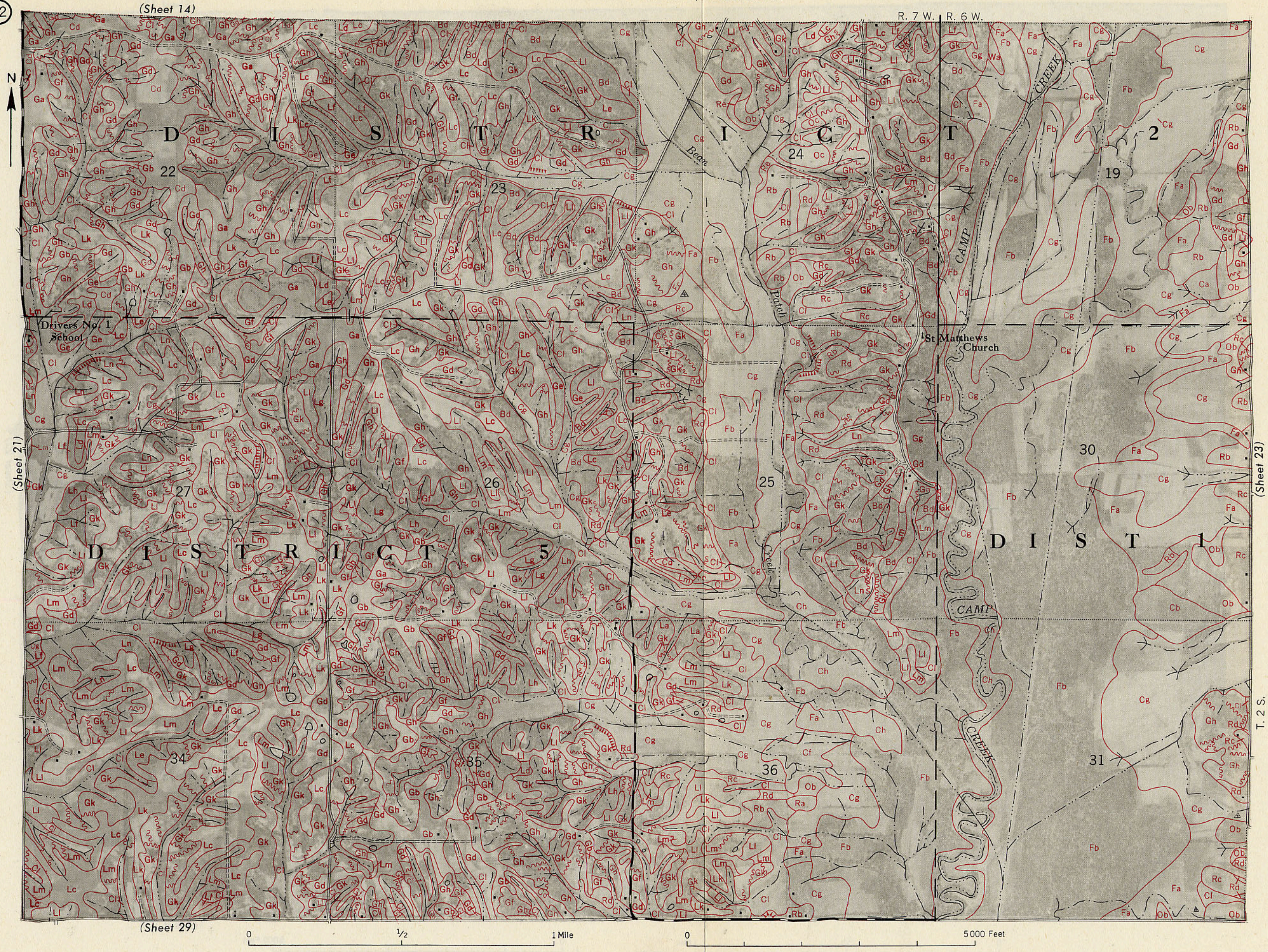
0 1/2 1 Mile

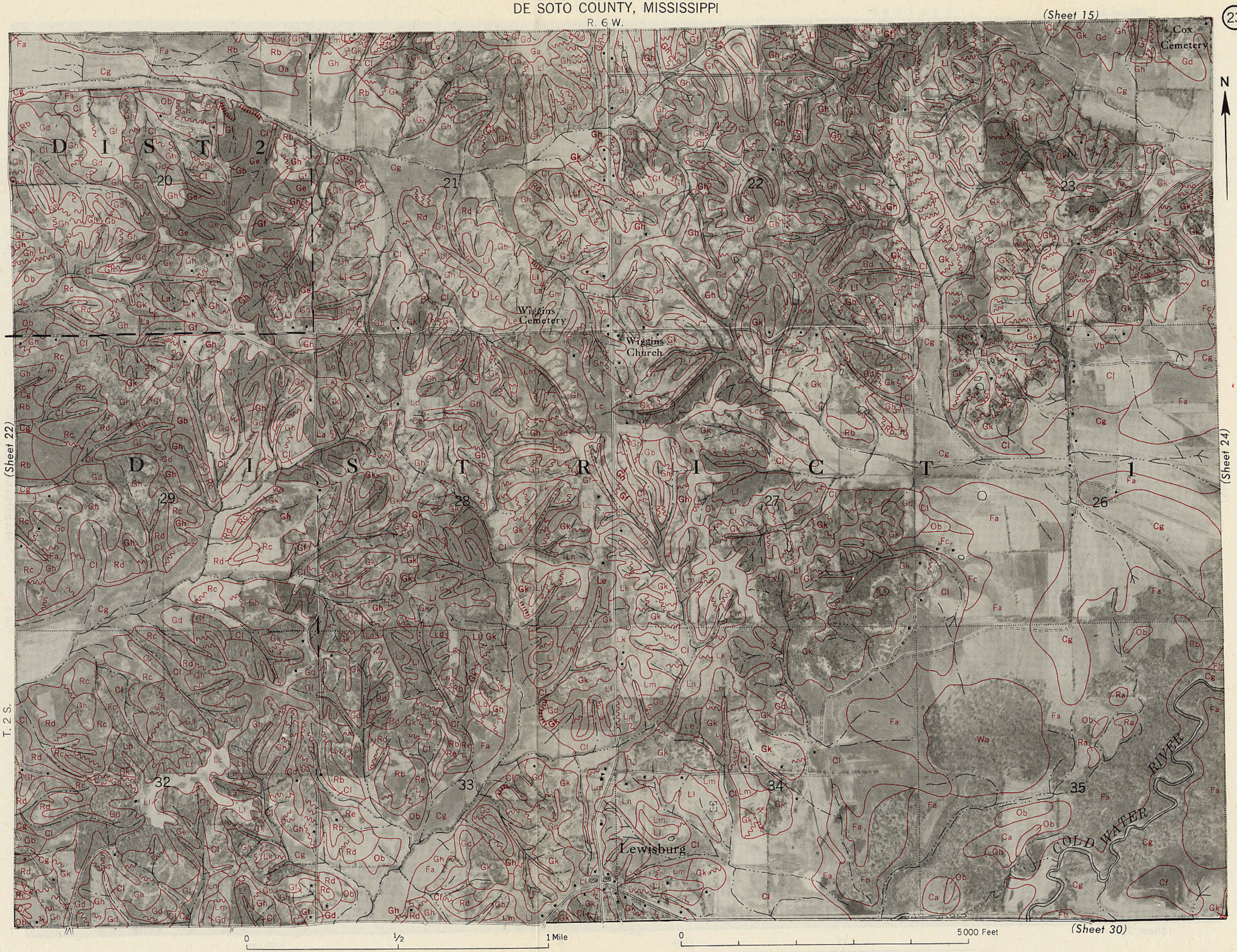
0 5000 Feet

DE SOTO COUNTY, MISSISSIPPI

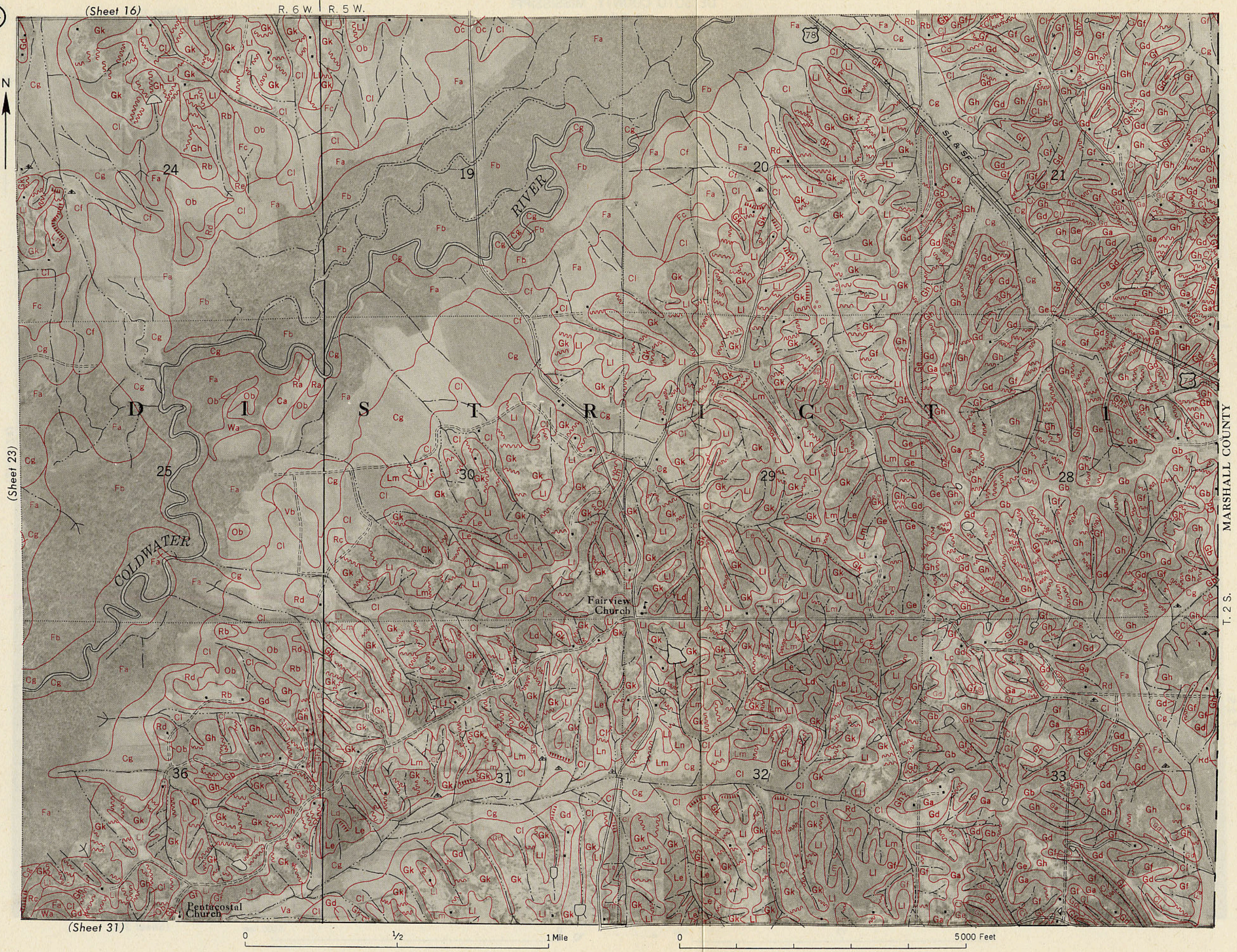


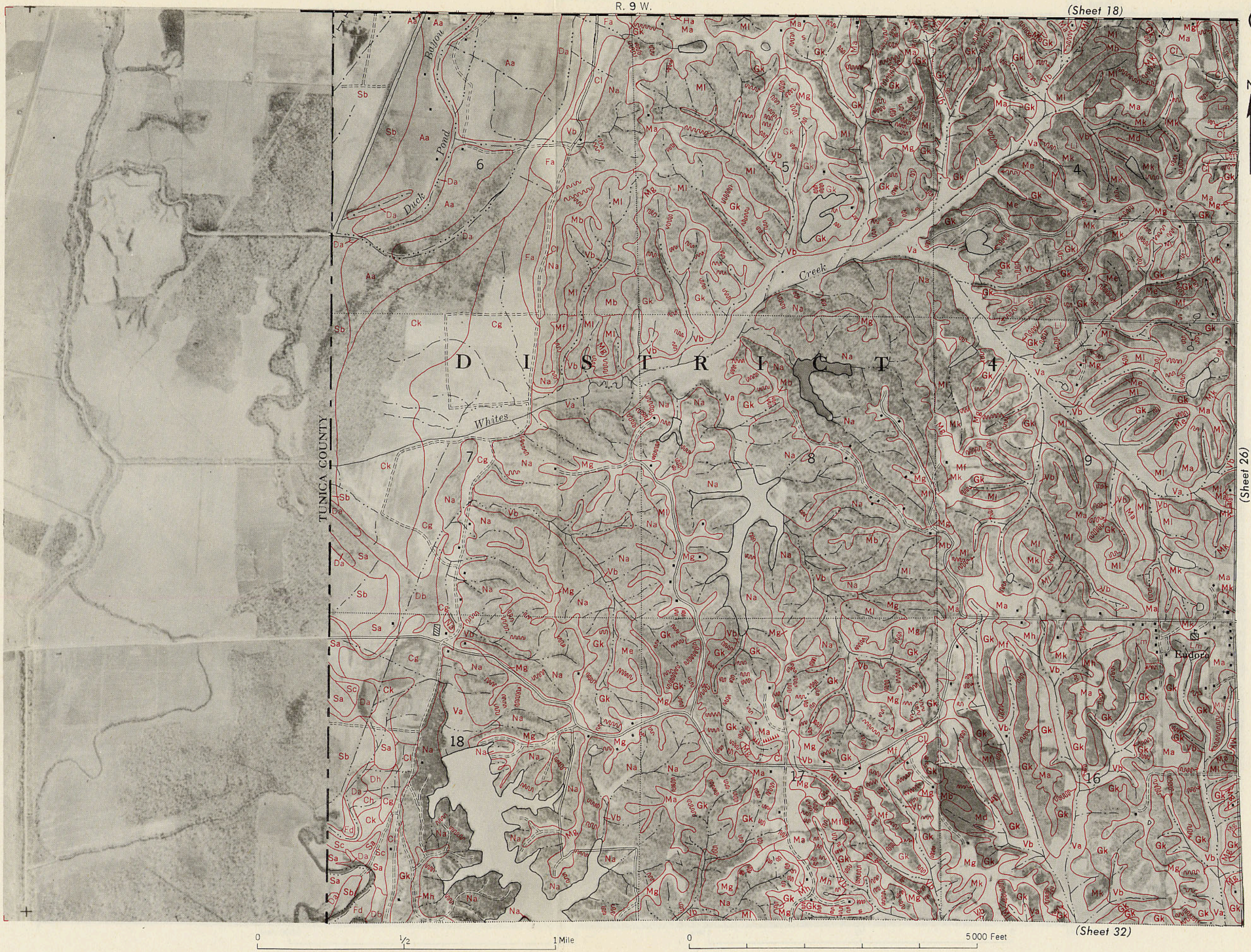

R. 8 W.
R. 7 W.
(Sheet 13)
N
Nesbitt School
Oak Grove Church
Mt Olive Church
D I S T R I C T 5
(Sheet 20)
(Sheet 22)
GRAVEL PIT
Bethlehem Church & Cemetery
HURRICANE CREEK
ILLINOIS CENTRAL
T. 2 S.
(Sheet 28)
0 1/2 1 Mile
0 5000 Feet

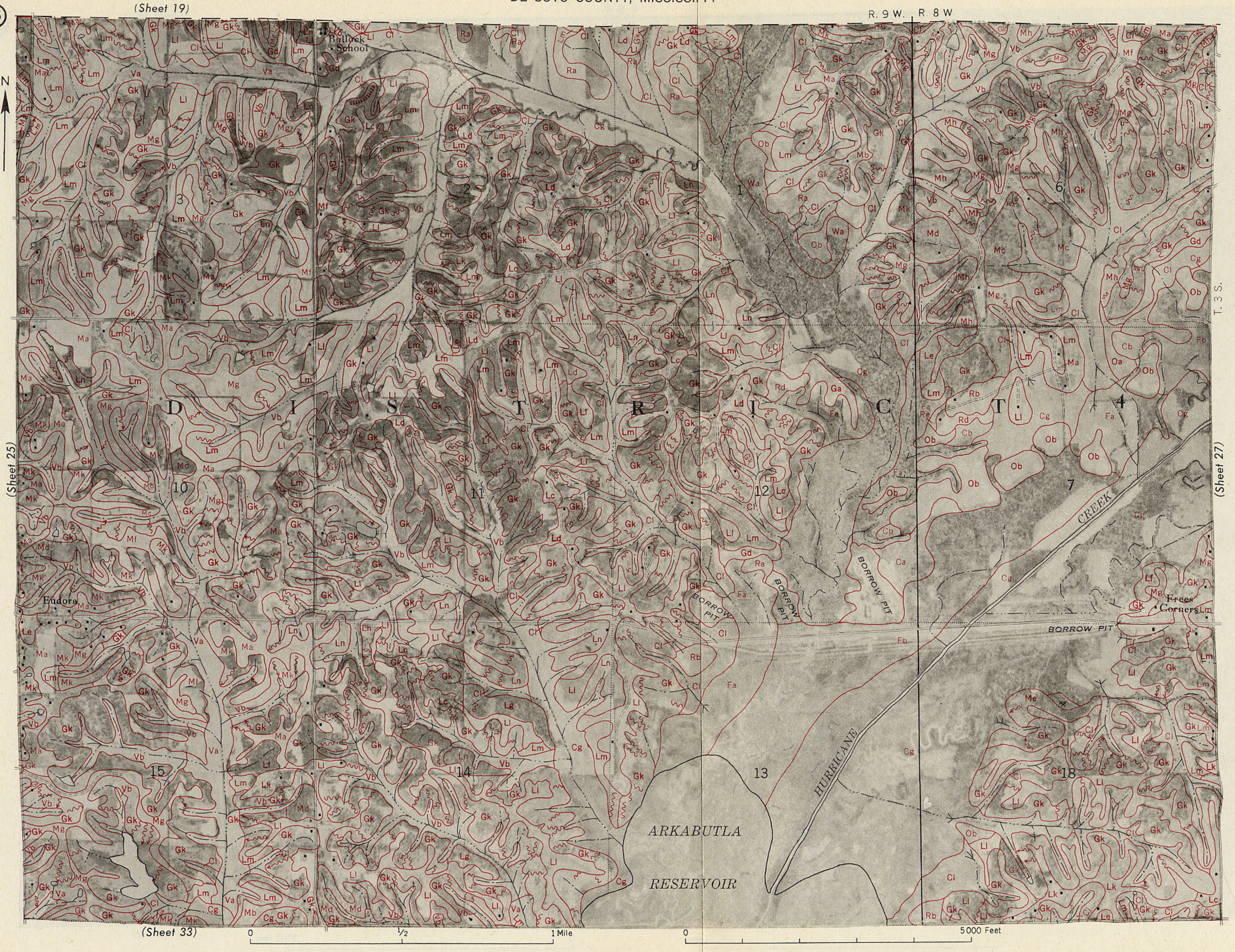

(Sheet 14)
R. 7 W.
R. 6 W.
N
DISTRICT 2
DISTRICT 5
DIST 1
Drivers No. 1 School
St Matthews Church
CAMP CREEK
Bean
Dutch
Creek
22
23
24
19
27
26
25
30
34
35
36
31
(Sheet 21)
(Sheet 23)
T. 2 S.
(Sheet 29)
0
1/2
1 Mile
0
5000 Feet

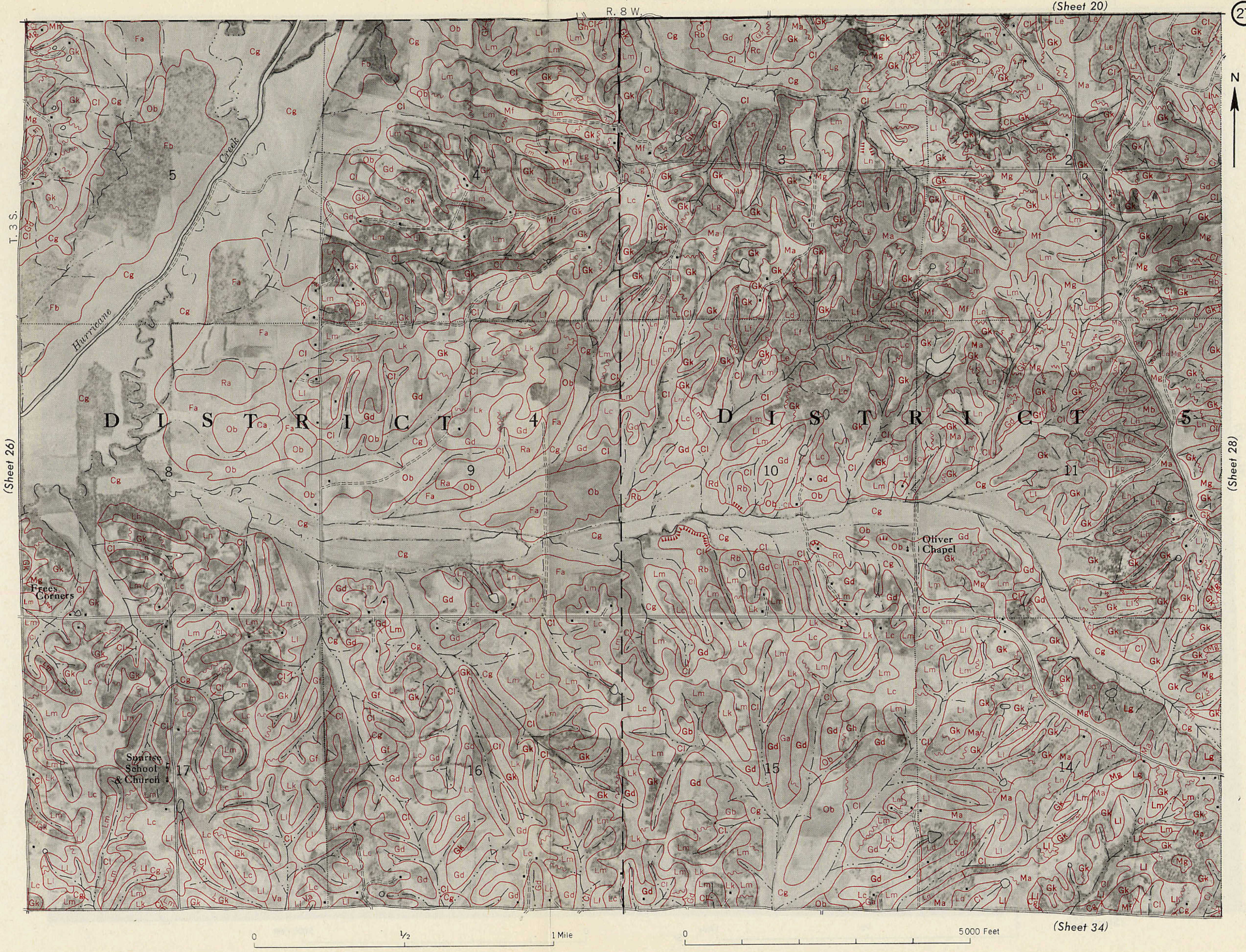


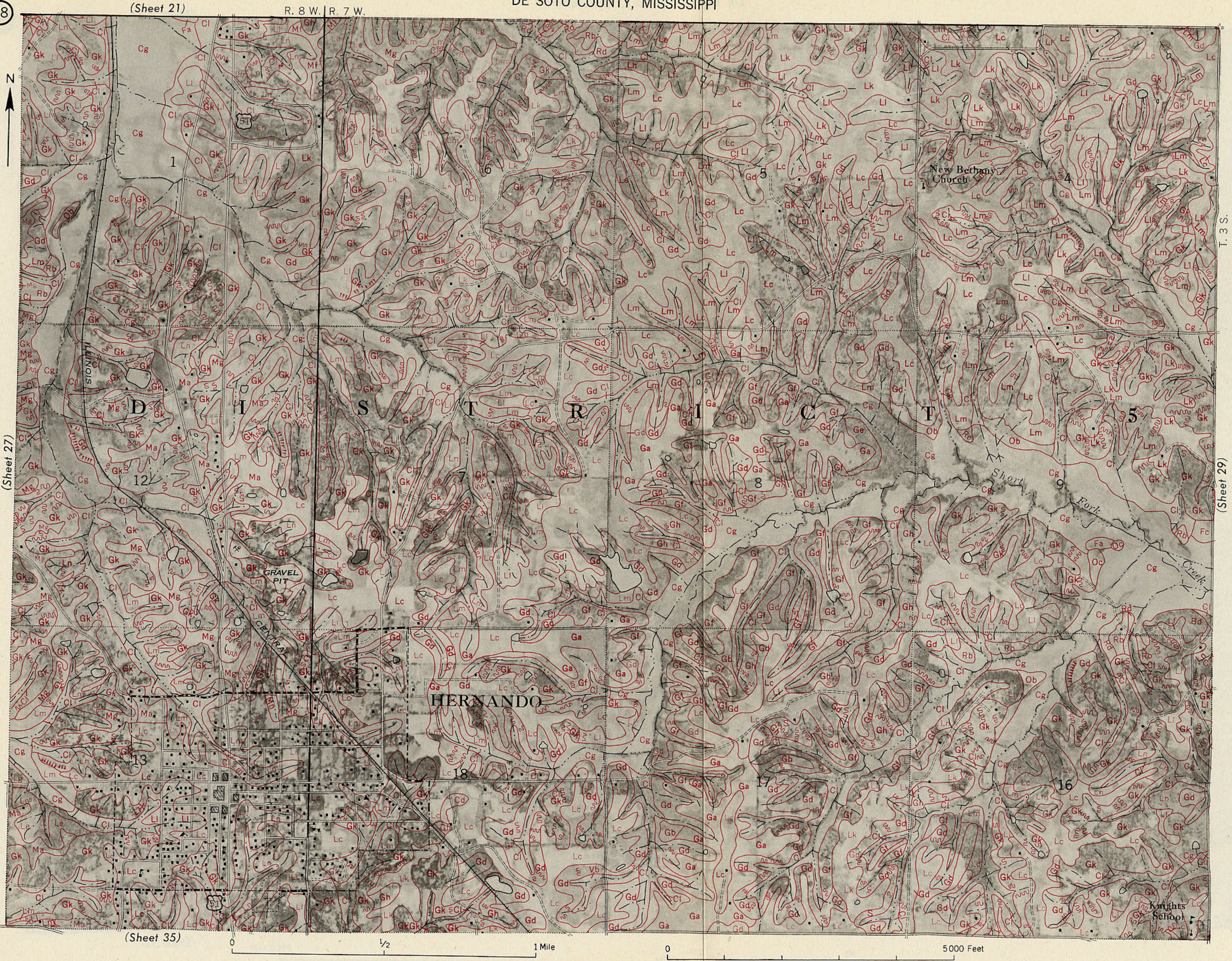
R. 6 W.
(Sheet 15)
Cox Cemetery
N
DIST. 2
20
21
22
23
Wiggins Cemetery
Wiggins Church
(Sheet 22)
(Sheet 24)
DISTRICT 1
29
28
27
26
T. 2 S.
32
33
34
35
Lewisburg
COLD WATER RIVER
(Sheet 30)
0
1/2
1 Mile
0
5 000 Feet

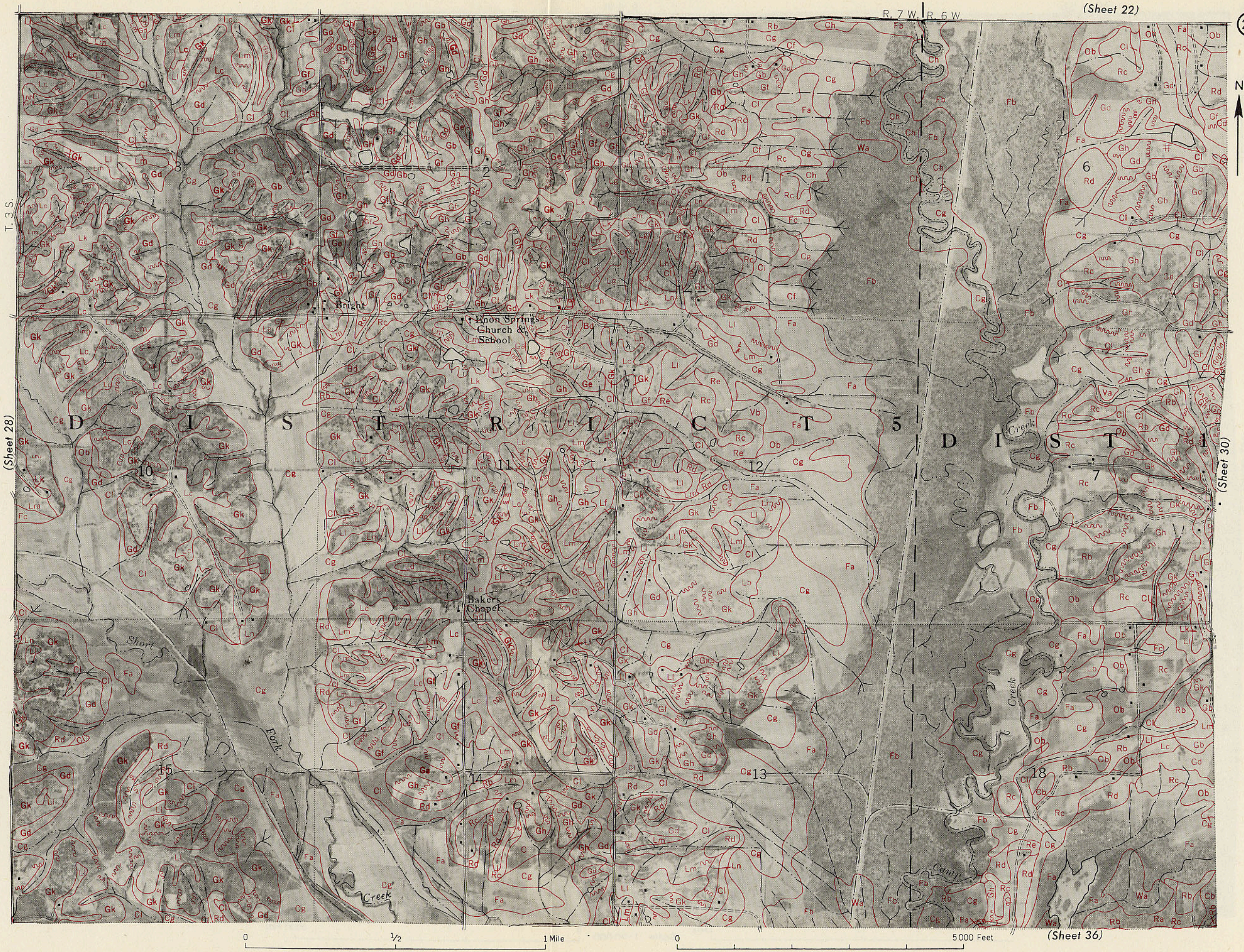

(Sheet 16)
R. 6 W.
R. 5 W.
N
(Sheet 23)
(Sheet 31)
MARSHALL COUNTY
T. 2 S.
D I S T R I C T 1
COLDWATER
RIVER
Fairview Church
Pentecostal Church
SL & SF
78
19
20
21
24
25
28
29
30
31
32
33
36
0
1/2
1 Mile
0
5000 Feet

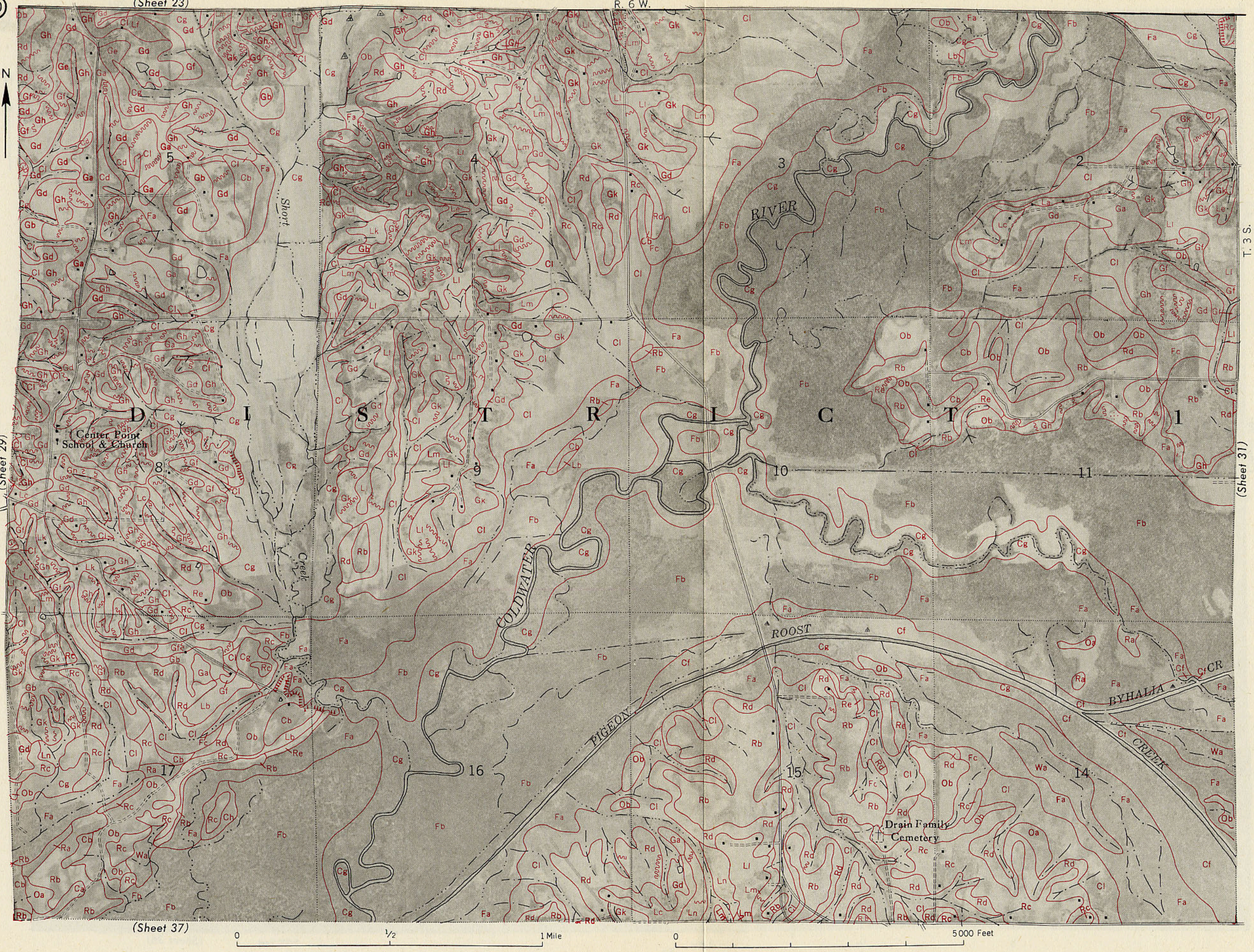

R. 9 W.
(Sheet 18)
(Sheet 26)
(Sheet 32)
N
TUNICA COUNTY
D I S T R I C T 4
Whites
Creek
Duck
Pond
Bayou
Eudora
6
5
4
7
8
9
18
17
16
0
½
1 Mile
0
5000 Feet

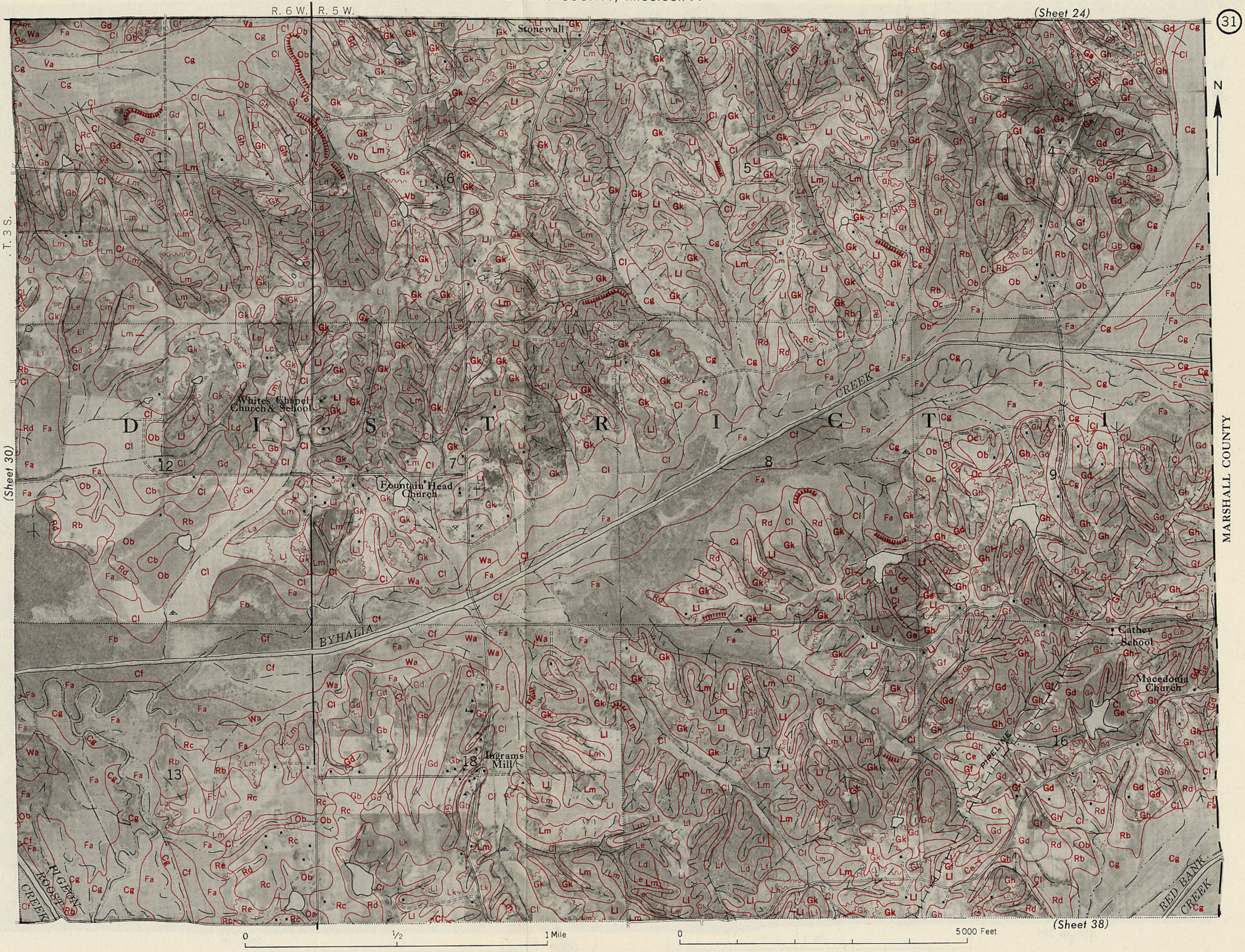

(Sheet 19)
R. 9 W.
R. 8 W.
N
Bullock School
D I S T R I C T
T. 3 S.
(Sheet 25)
(Sheet 27)
Eudora
Frees Corners
BORROW PIT
HURRICANE
CREEK
ARKABUTLA
RESERVOIR
(Sheet 33)
0
1/2
1 Mile
0
5000 Feet

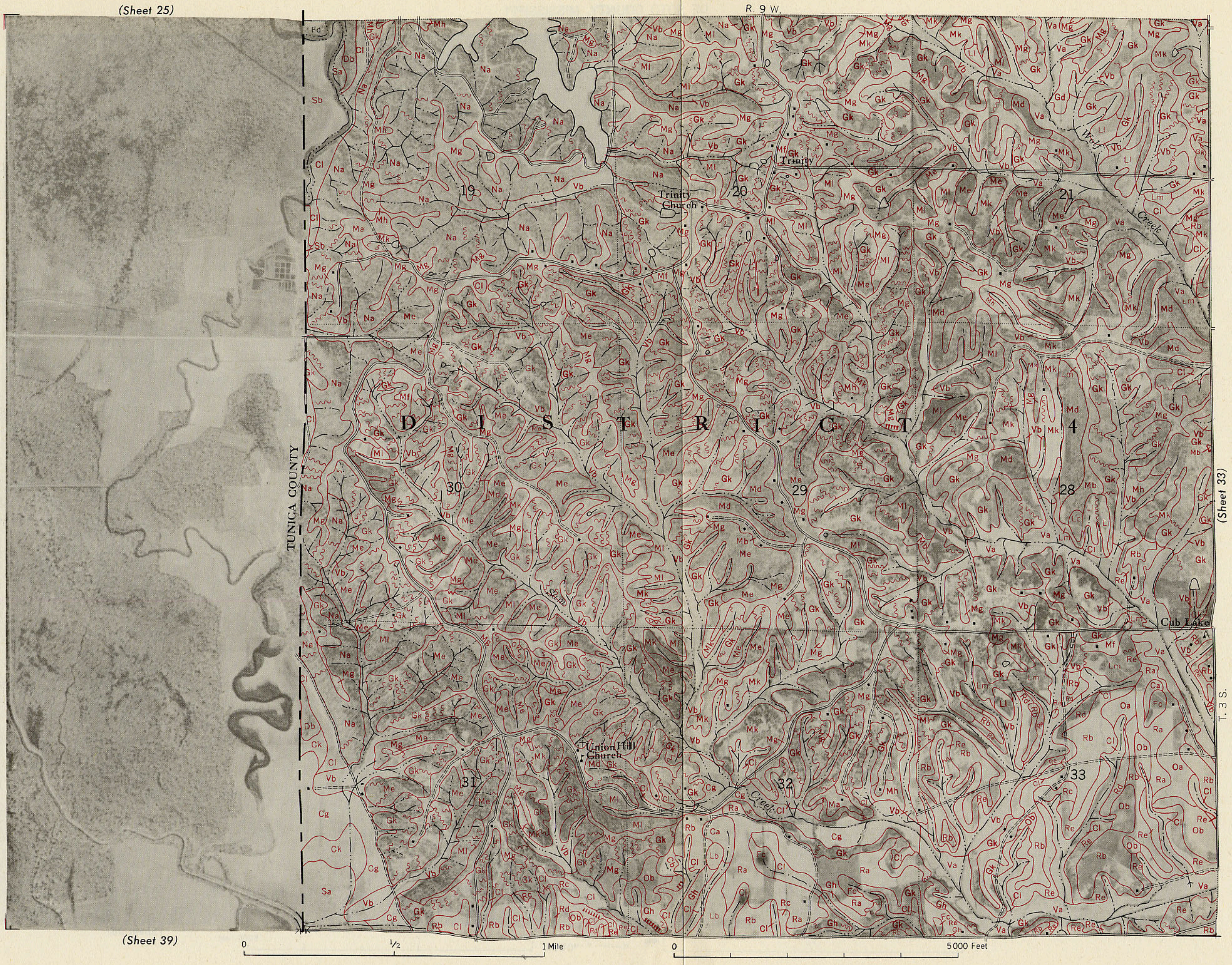

R. 8 W.
(Sheet 20)
N
T. 3 S.
(Sheet 26)
(Sheet 28)
(Sheet 34)
Hurricane
Creek
DISTRICT 4
DISTRICT 5
Oliver Chapel
Frees Corners
Sunrise School & Church
0
1/2
1 Mile
0
5000 Feet

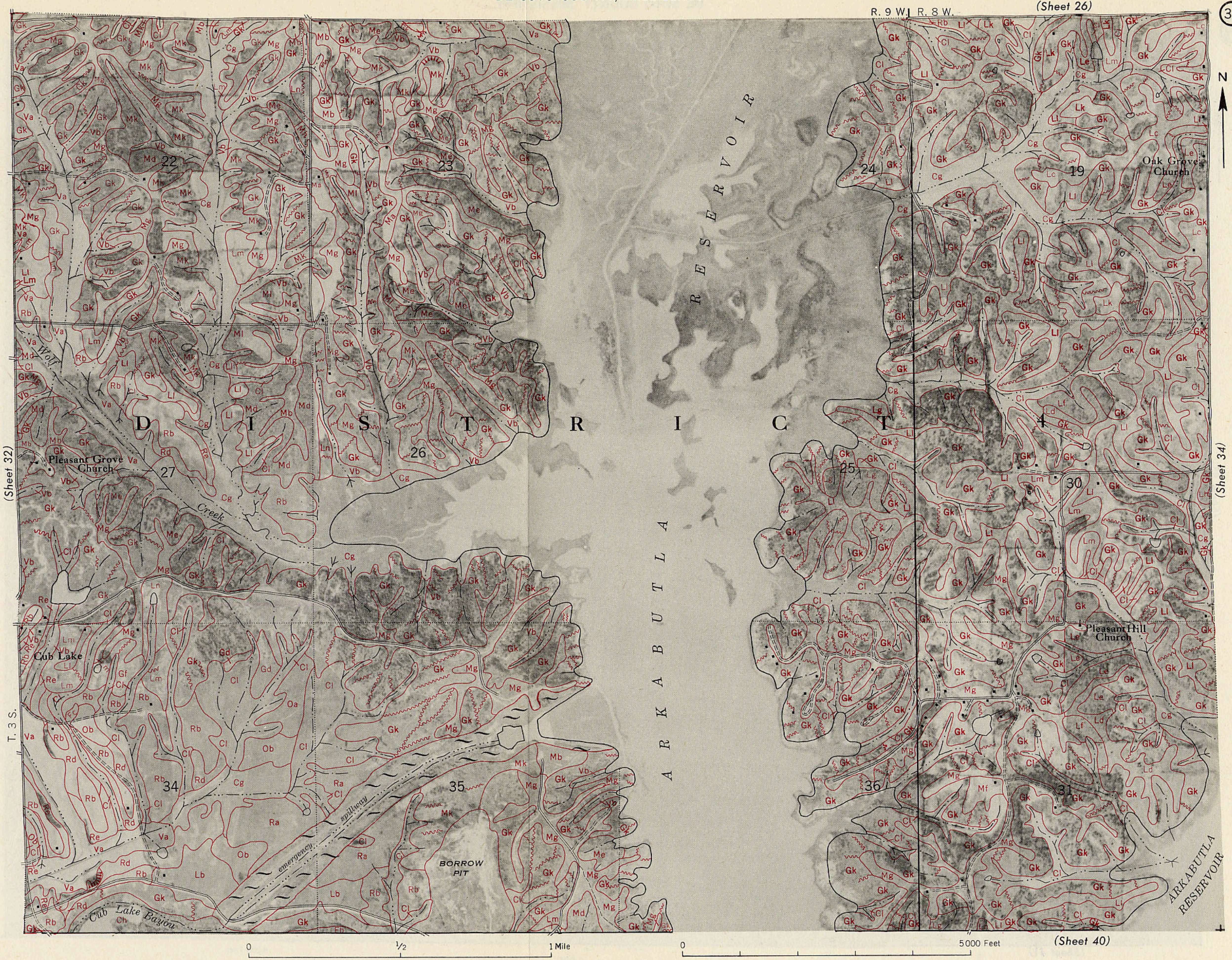

(Sheet 21)
R. 8 W.
R. 7 W.
N
T. 3 S.
(Sheet 27)
(Sheet 29)
(Sheet 35)
New Bethany Church
D I S T R I C T 5
GRAVEL PIT
ILLINOIS
CENTRAL
HERNANDO
Short Fork Creek
Knights School
0
½
1 Mile
0
5000 Feet


(Sheet 22)
R. 7 W. | R. 6 W.
N
T. 3 S.
(Sheet 28)
(Sheet 30)
(Sheet 36)
Bright
Enon Springs Church & School
Bakers Chapel
D I S T R I C T 5
D I S T
Short Fork Creek
Camp Creek
Creek
0 1/2 1 Mile
0 5000 Feet

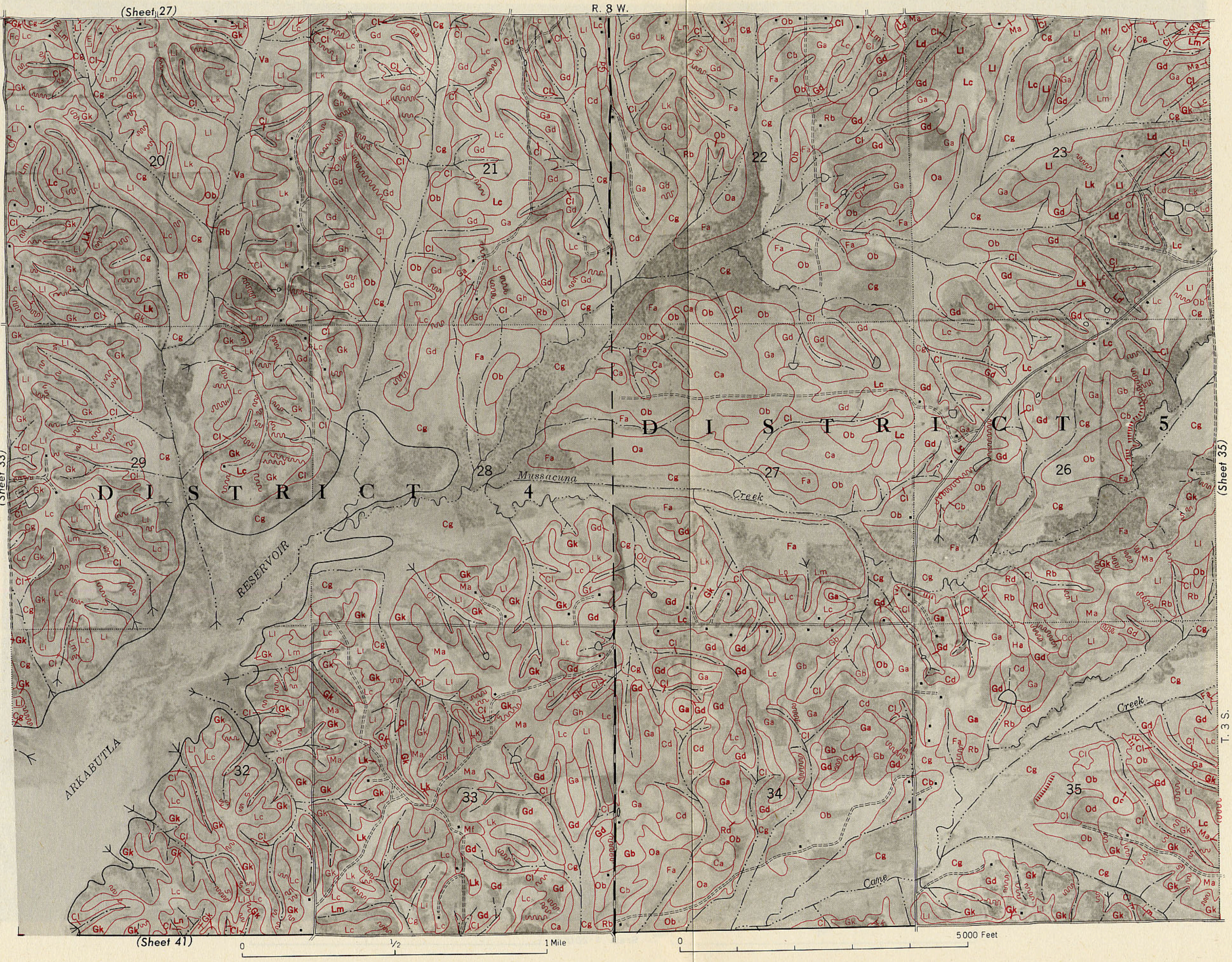

(Sheet 23)
R. 6 W.
N
T. 3 S.
(Sheet 29)
(Sheet 31)
(Sheet 37)
Short
Creek
RIVER
COLDWATER
PIGEON
ROOST
BYHALIA CR
CREEK
D I S T R I C T 1
Center Point
School & Church
Drain Family
Cemetery
5
4
3
2
8
9
10
11
17
16
15
14
0
1/2
1 Mile
0
5000 Feet

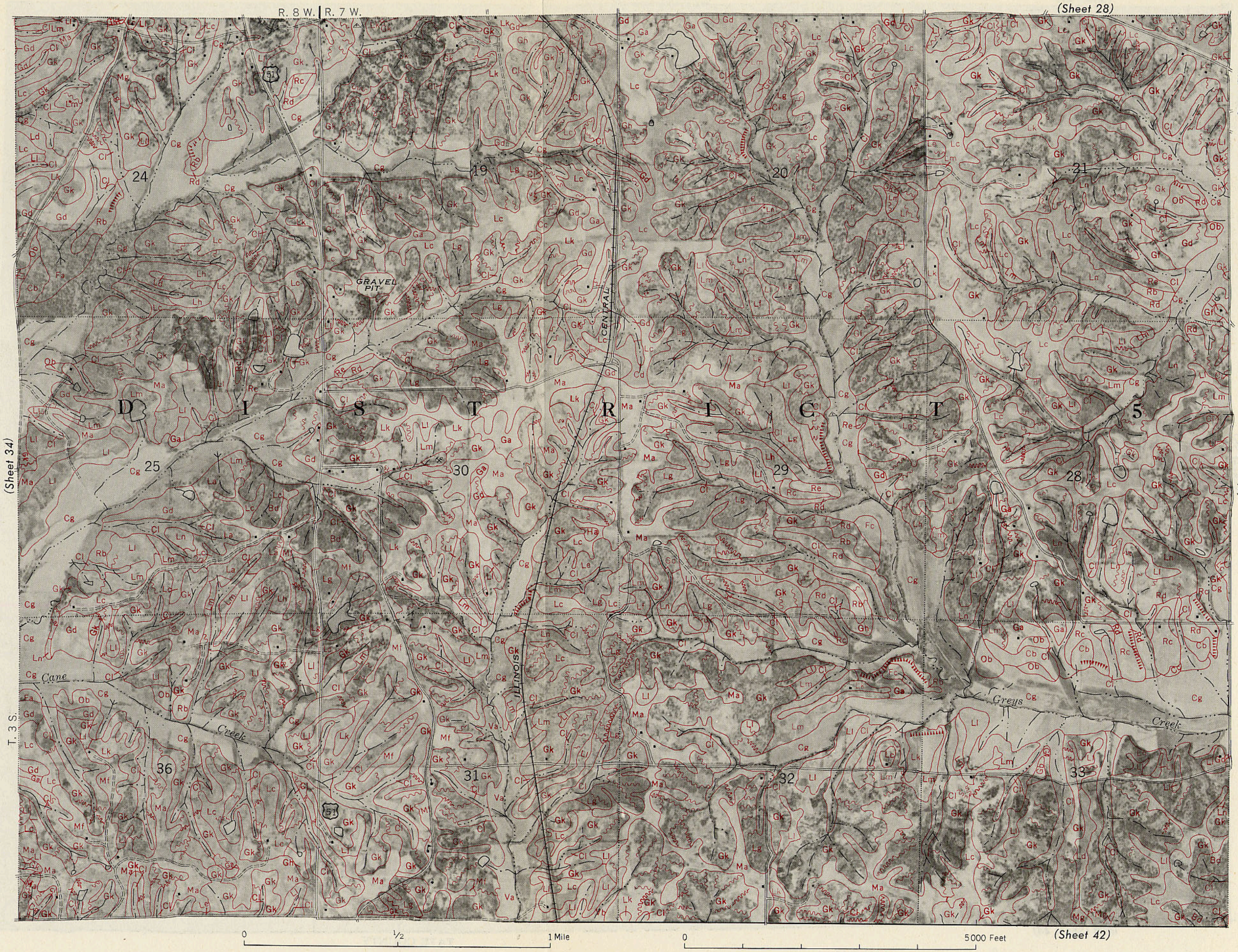

31
R. 6 W.
R. 5 W.
(Sheet 24)
(Sheet 30)
(Sheet 38)
T. 3 S.
N
MARSHALL COUNTY
Stonewall
Whites Chapel Church & School
Fountain Head Church
Ingrams Mill
Cathey School
Macedonia Church
D I S T R I C T
BYHALIA CREEK
PIGEON ROOST CREEK
RED BANK CREEK
PIPELINE
0
1/2
1 Mile
0
5000 Feet


(Sheet 25)
R. 9 W.
N
Trinity
Trinity Church
19
20
21
TUNICA COUNTY
D I S T R I C T 4
30
29
28
(Sheet 33)
Cub Lake
Union Hill Church
31
32
33
T. 3 S.
(Sheet 39)
0
1/2
1 Mile
0
5000 Feet

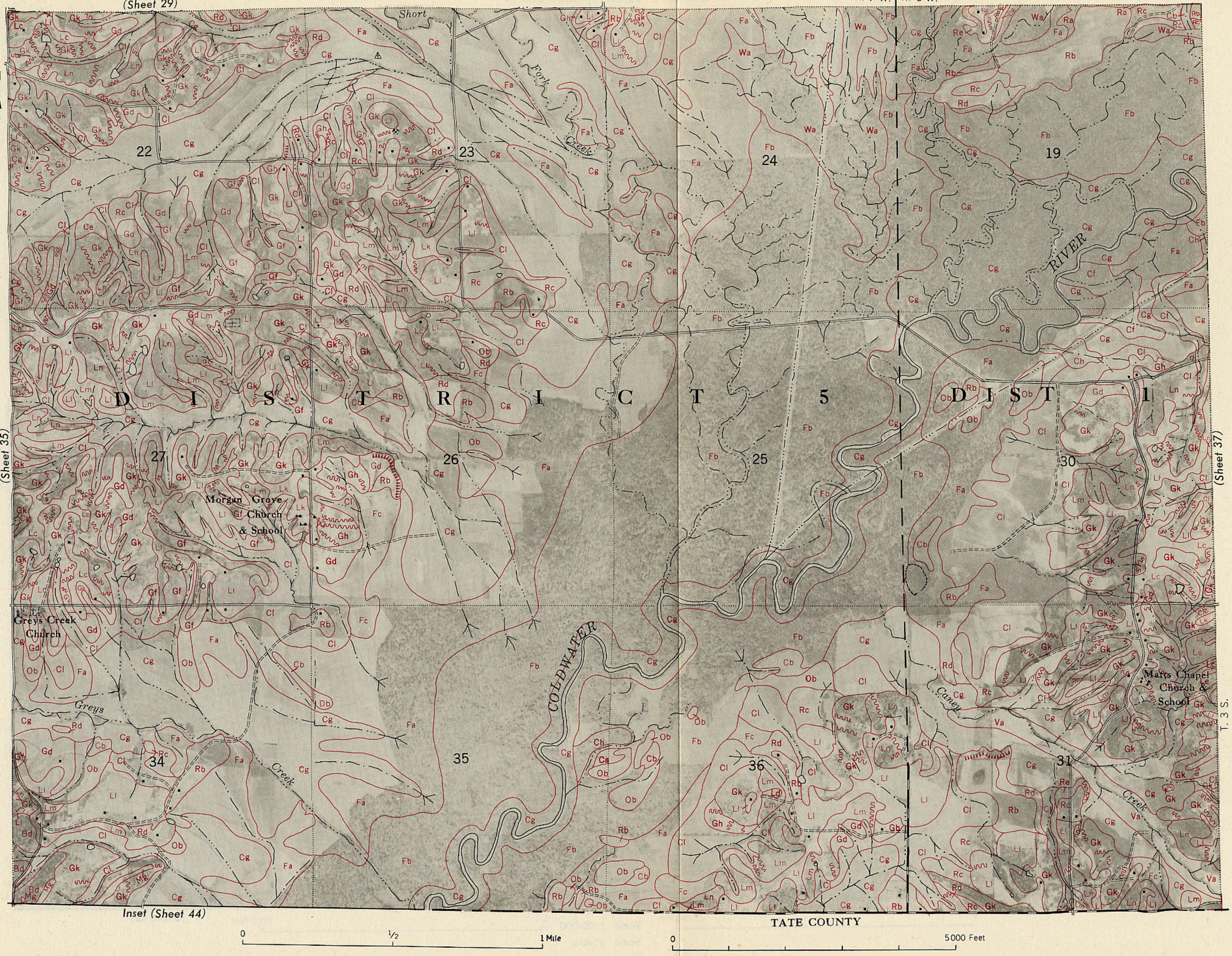

R. 9 W.
R. 8 W.
(Sheet 26)
N
(Sheet 32)
(Sheet 34)
(Sheet 40)
T. 3 S.
RESERVOIR
DISTRICT
ARKABUTLA
Oak Grove Church
Pleasant Grove Church
Pleasant Hill Church
Cub Lake
Wolf Creek
Cub Lake Bayou
emergency spillway
BORROW PIT
ARKABUTLA RESERVOIR
22
23
24
19
26
27
25
4
30
34
35
36
31
0
½
1 Mile
0
5000 Feet

DE SOTO COUNTY MISSISSIPPI



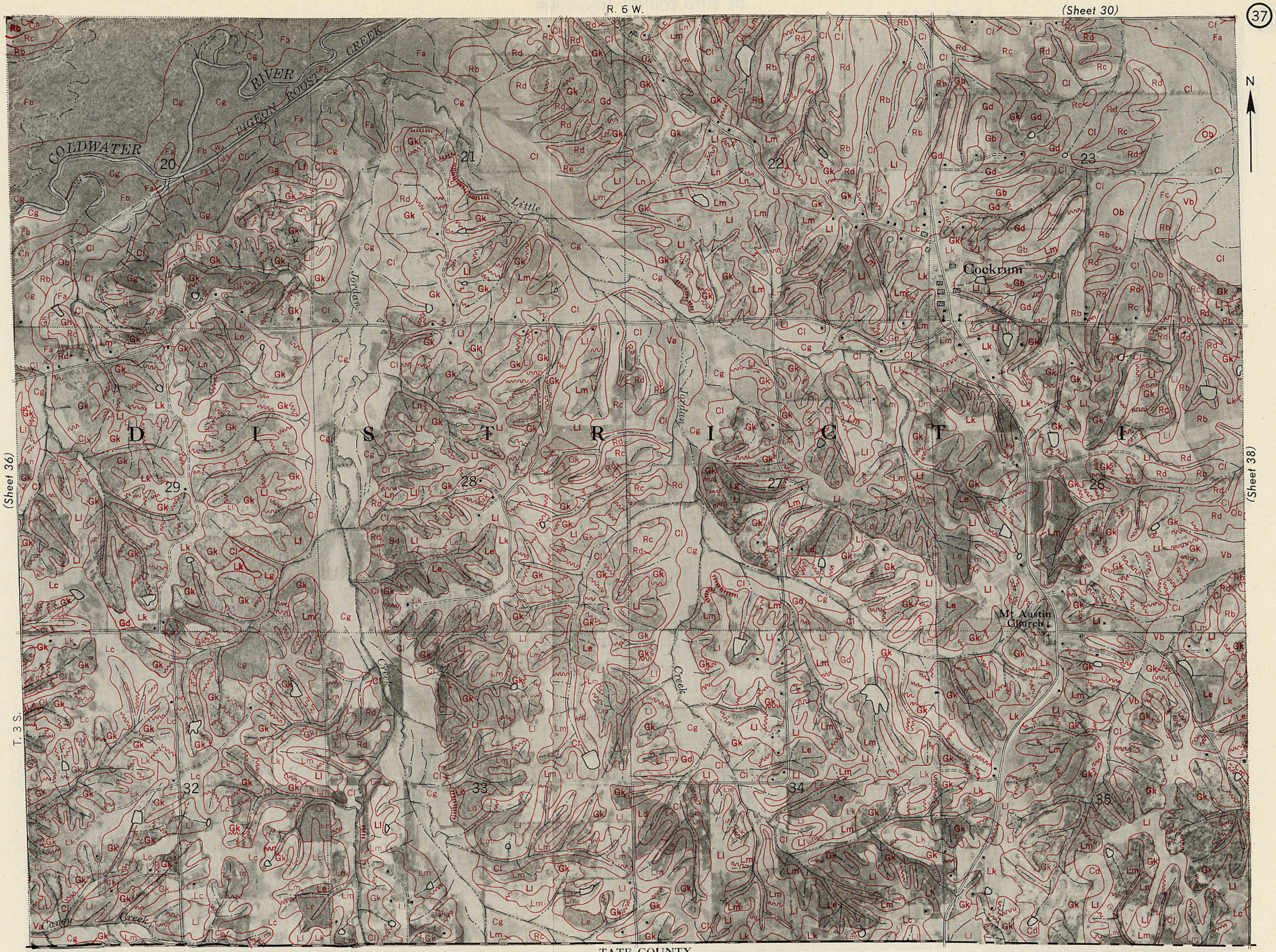

(Sheet 28)
R. 8 W.
R. 7 W.
N
GRAVEL PIT
CENTRAL
ILLINOIS
D I S T R I C T 5
(Sheet 34)
(Sheet 36)
T. 3 S.
19
20
21
24
25
30
29
28
36
31
32
33
Cane
Creek
Greys
Creek
0
1/2
1 Mile
0
5000 Feet
(Sheet 42)

DE SOTO COUNTY, MISSISSIPPI



R. 6 W.

(Sheet 30)



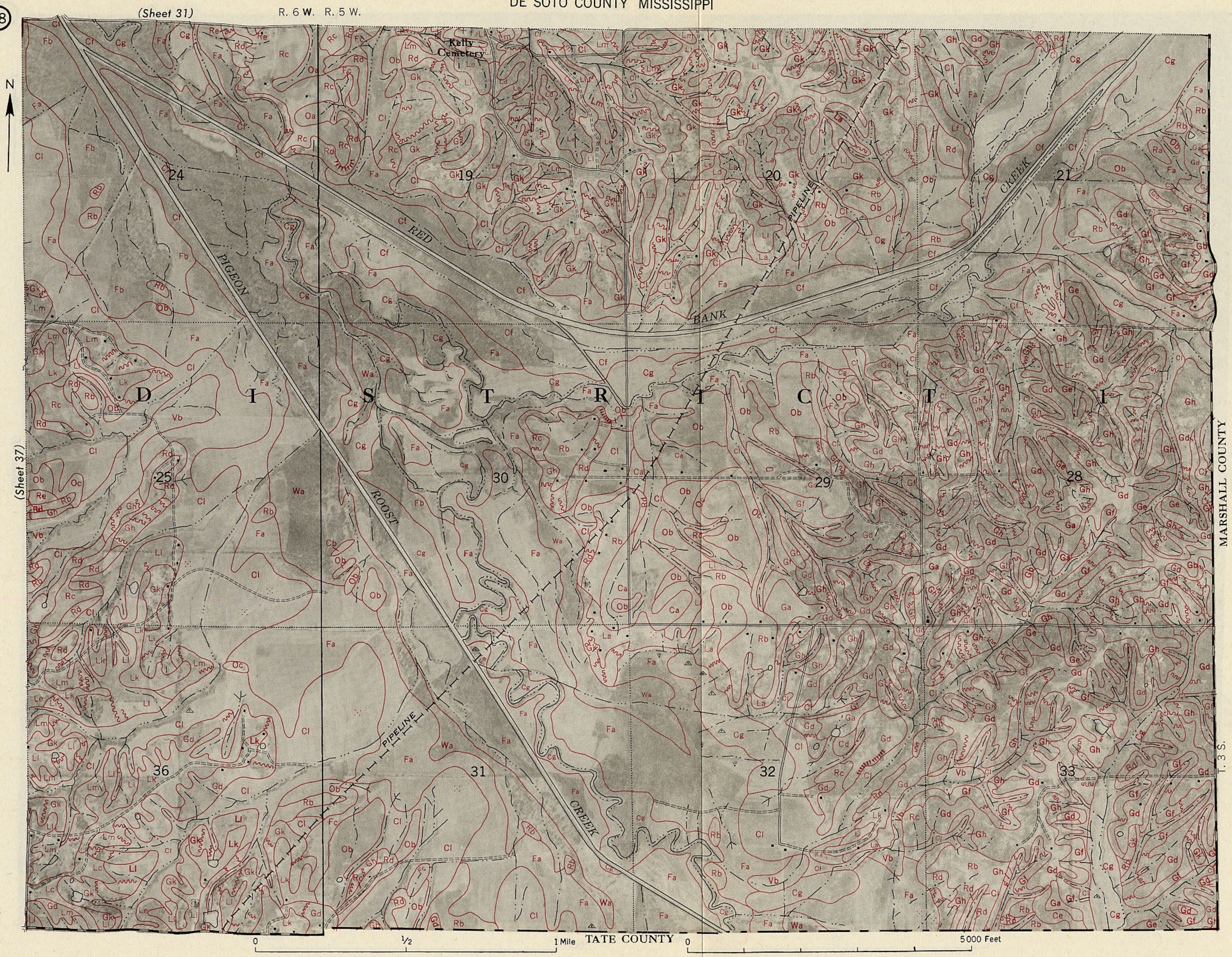
0 ½ 1 Mile

TATE COUNTY

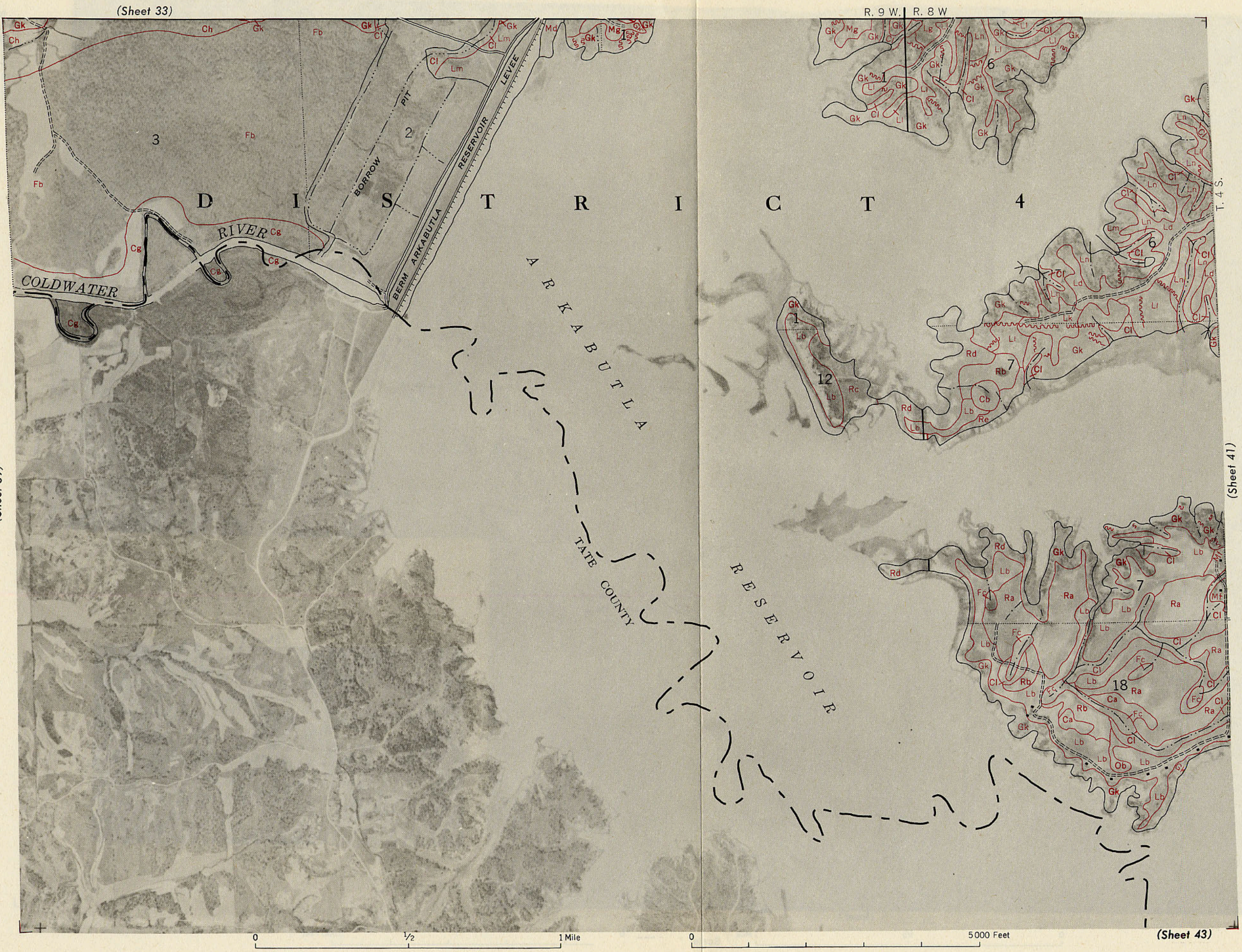
0 5000 Feet

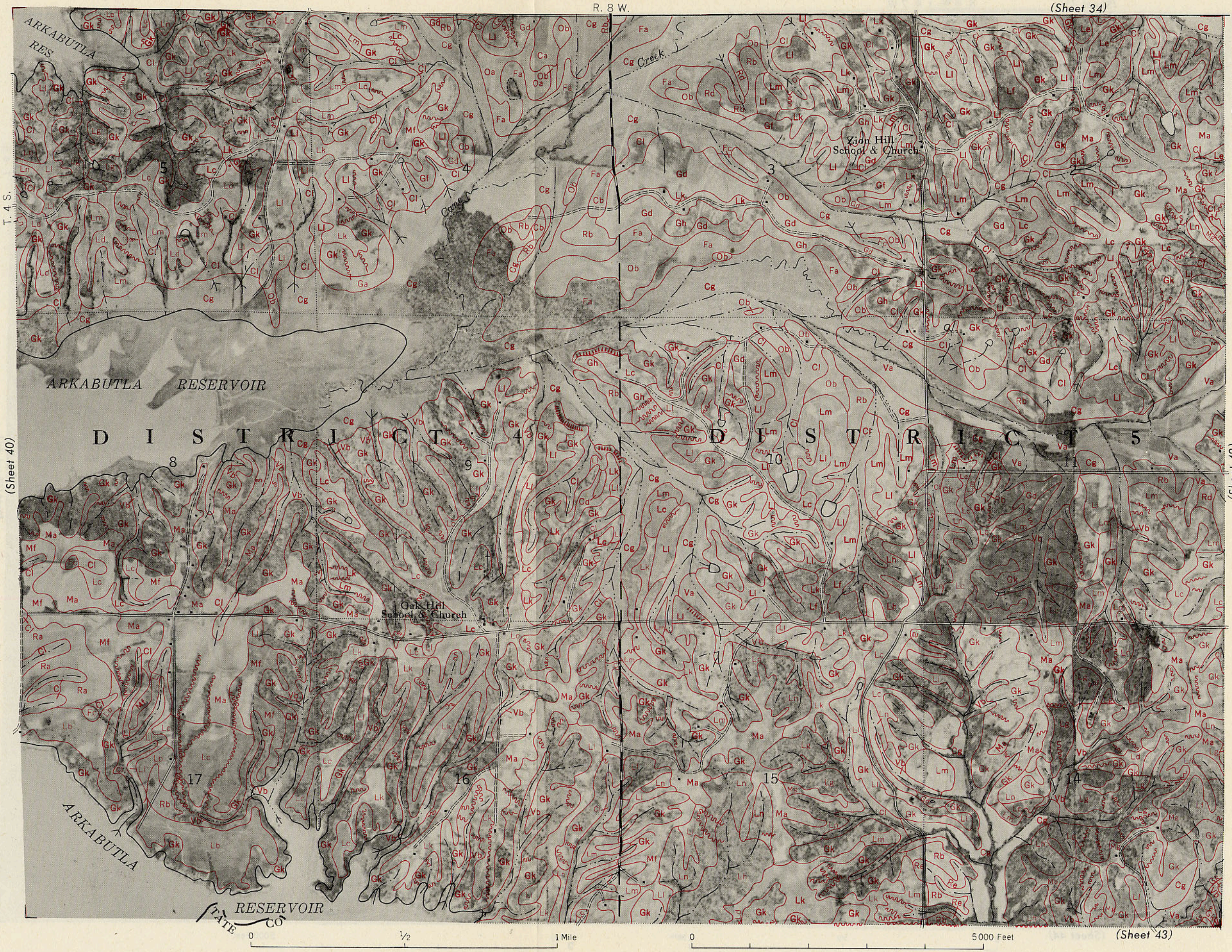
(38)

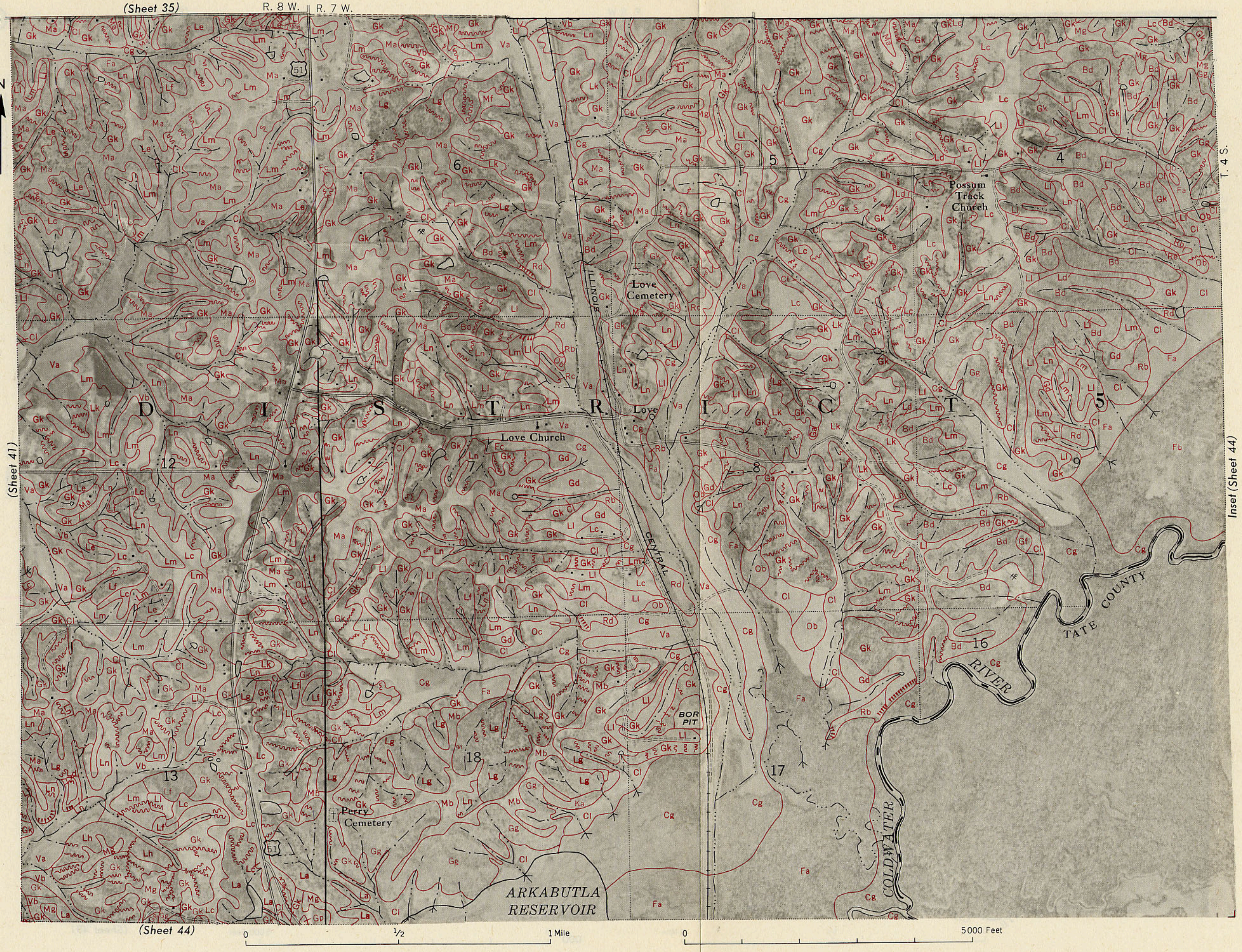
DE SOTO COUNTY MISSISSIPPI

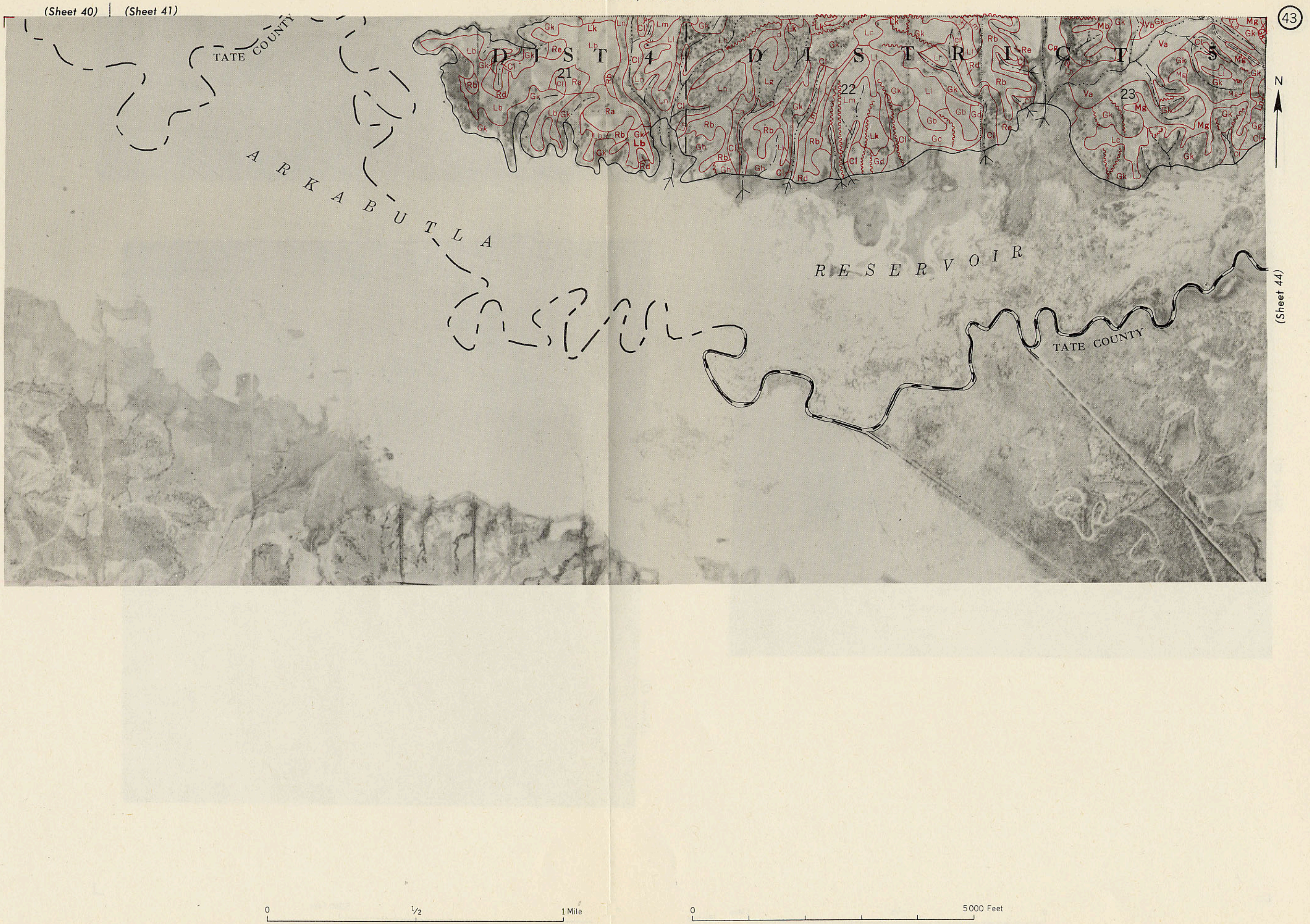



(Sheet 32)
R. 9 W.
N
T. 4 S.
TUNICA COUNTY
D I S T R I C T
CUB LAKE
Cub Lake Bayou
Swm
COLDWATER RIVER
CUTOFF
CUTOFF
TATE COUNTY
TATE COUNTY
(Sheet 40)
(Inset)
(Sheet 39)
TUNICA COUNTY
TATE COUNTY
4
5
6
7
8
9
18
19
0
1/2
1 Mile
0
5000 Feet


(Sheet 33)
(Sheet 39)
(Sheet 41)
(Sheet 43)
N
R. 9 W.
R. 8 W.
T. 4 S.
DISTRICT 4
COLDWATER RIVER
BORROW PIT
ARKABUTLA RESERVOIR LEVEE
BERM
ARKABUTLA RESERVOIR
TATE COUNTY
0
1/2
1 Mile
0
5000 Feet


R. 8 W.
(Sheet 34)
N
T. 4 S.
ARKABUTLA
RES.
Zion Hill
School & Church
ARKABUTLA RESERVOIR
D I S T R I C T 4
D I S T R I C T 5
(Sheet 40)
(Sheet 42)
Oak Hill
School & Church
ARKABUTLA
RESERVOIR
TATE CO
(Sheet 43)
0
1/2
1 Mile
0
5000 Feet


(Sheet 35)
R. 8 W.
R. 7 W.
T. 4 S.
Possum Track Church
Love Cemetery
Love
Love Church
ILLINOIS
CENTRAL
D I S T R I C T 5
(Sheet 41)
Inset (Sheet 44)
BOR PIT
Perry Cemetery
ARKABUTLA RESERVOIR
COLDWATER
RIVER
TATE COUNTY
(Sheet 44)
0
½
1 Mile
0
5000 Feet


(Sheet 40)
(Sheet 41)
(Sheet 44)
TATE COUNTY
DIST 4
DISTRICT 5
21
22
23
ARKABUTLA
RESERVOIR
TATE COUNTY
N
0
½
1 Mile
0
5000 Feet


44
(Sheet 42)
R. 8 W.
R. 7 W.
D I S T R I C T 5
19
20
24
ARKABUTLA
RESERVOIR
TATE COUNTY
COLDWATER
RIVER
ILLINOIS CENTRAL
T. 4 S.
(Sheet 43)
N
(Sheet 36)
R. 7 W.
D I S T 5
3
2
10
RIVER
TATE COUNTY
COLDWATER
(Sheet 42)
T. 4 S.
0
1/2
1 Mile
0
5000 Feet